SP2-MTL Series | User's Guide

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ADLINK
LEADING EDGE COMPUTING

Revision History

Revision	Description	Date	Author
1.0	Initial release	2025-05-09	AL
1.1	Introduction, specifications, pinouts and connectors, and getting started updated	2025-05-15	AL

Preface

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Safety Instructions

For user safety, please read and follow all Instructions, **WARNING**s, **CAUTION**s, and **NOTE**s marked in this manual and on the associated equipment before handling/operating the equipment.

Read these safety instructions carefully:

- Keep the User's Manual for future reference.
- Read the Specifications section of this manual for detailed information on the recommended operating environment.
- It is recommended that the device be installed in Information
- Technology Rooms that are in accordance with Article 645 of the National Electrical Code and NFPA 75.
- When installing/mounting or uninstalling/removing device is required:
    - Turn off power and unplug any power cords/cables.
    - Reinstall all chassis covers before restoring power.
- To avoid electrical shock and/or damage to device:
    - Keep device away from water or liquid sources.
    - Keep device away from high heat or humidity.
    - Keep device properly ventilated (do not block or cover ventilation openings).
    - Always use recommended voltage and power source settings.
    - Always install and operate device near an easily accessible electrical outlet.
    - Secure the power cord (do not place any object on/over the power cord).
    - Only install/attach and operate device on stable surfaces and/or recommended mountings.
    - The device is powered by an adapter or DC source. Ensure that the adapter or DC source is properly grounded.
- If the device will not be used for long periods of time, turn off and unplug from its power source.
- Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools.
- A Lithium-type battery may be provided for uninterrupted backup or emergency power.
- The device must be serviced by authorized technicians when:
    - The power cord or plug is damaged.
    - Liquid has entered the device interior.
    - The device has been exposed to high humidity and/or moisture.
    - The device is not functioning or does not function according to the User's Manual.
    - The device has been dropped and/or damaged and/or shows obvious signs of breakage.
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up.

- It is recommended that the device be installed only in a server room or computer room where access is:
  - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required.
  - Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location.

Caution: Risk of explosion if battery is replaced with one of an incorrect type; please dispose of used batteries appropriately.

BURN HAZARD
Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching.

Consignes de Sécurité Importante

Pour la sécurité de l'utilisateur, veuillez lire et suivre toutes les instructions, avertissements, mises en garde et notes marqués dans ce manuel et sur l'appareil associé avant de manipuler/d'utiliser l'appareil, afin d'éviter toute blessure ou tout dommage.

- *Lisez attentivement ces consignes de sécurité*
- *Conservez le manuel de l'utilisateur pour pouvoir le consulter Ultérieurement*
- *Lisez la section Spécifications de ce manuel pour des informations détaillées sur l'environnement d'exploitation recommandé*
- *Il est recommandé d'installer l'appareil dans Information Salles technologiques conformes à l'article 645 du Code national de l'électricité et NFPA 75.*
- *Lorsque l'installation/le montage ou la désinstallation/le retrait du périphérique est requis:*
  - *Mettez l'appareil hors tension et débranchez tous les cordons/câbles d'alimentation*
  - *Réinstallez tous les couvercles de châssis avant de rétablir l'alimentation*
- *Pour éviter les chocs électriques et/ou d'endommager l'appareil:*
  - *Tenez l'appareil à l'écart de toute source d'eau ou de liquide.*
  - *Tenez l'appareil à l'écart d'une forte chaleur ou d'une humidité élevée.*
  - *Maintenez l'appareil correctement ventilé (n'obstruer ou ne couvrez pas les ouvertures de ventilation).*
  - *Utilisez toujours les réglages de tension et de source d'alimentation recommandés.*
  - *Installez et utilisez toujours l'appareil près d'une prise de courant facilement accessible.*
  - *Fixez le cordon d'alimentation (ne placez aucun objet sur le cordon d'alimentation).*
  - *Installez/fixez et utilisez l'appareil uniquement sur des surfaces stables et/ou sur les fixations recommandées.*

- *L'ordinateur Smart Touch est alimenté par un adaptateur ou une source CC. Veuillez vous assurer que l'adaptateur ou la source CC doit conserver la connexion à la terre s'il est doté d'une protection.*

- *Si l'appareil ne doit pas être utilisé pendant de longues périodes, éteignez-le et débranchez-le de sa source d'alimentation*
- *N'essayez jamais de réparer l'appareil, qui ne doit être réparé que par un personnel technique qualifié à l'aide d'outils appropriés*
- *Une batterie de type Lithium peut être fournie pour une alimentation de secours ininterrompue ou d'urgence.*
- *L'appareil doit être entretenu par des techniciens agrees lorsque:*
  - *Le cordon d'alimentation ou la prise est endommagé(e)*
  - *Un liquide a pénétré à l'intérieur de l'appareil.*
  - *L'appareil a été exposé à une forte humidité et/ou de la buée.*
  - *L'appareil ne fonctionne pas ou ne fonctionne pas selon le manuel de l'utilisateur.*
  - *L'appareil est tombé et/ou a été endommagé et/ou présente des signes évidents de dommage.*
- *Débranchez le cordon d'alimentation avant de desserrer les vis à oreilles et serrez toujours les vis à oreilles avec un tournevis avant de mettre le système en marche.*
- *Il est recommandé d'installer l'appareil uniquement dans une salle de serveurs ou une salle informatique où l'accès est:*
  - *Réservé au personnel de service qualifié ou aux utilisateurs familiarisés avec les restrictions appliquées à l'emplacement, aux raisons de ces restrictions et toutes les précautions requises*
  - *Uniquement autorisé par l'utilisation d'un outil, d'une serrure et d'une clé, ou d'un autre moyen de sécurité, et contrôlé par l'autorité responsable de l'emplacement.*

	***RISQUE DE BRÛLURES*** *Ne touchez pas cette surface, cela pourrait entraîner des blessures. Pour éviter tout danger, laissez la surface refroidir avant de la toucher.*

EMC Compliance

CE Warning

This is a Class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

FCC warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures to correct the interference:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from the one to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for assistance.

Conventions

The following conventions may be used throughout this manual, denoting special levels of information.

Note: This information adds clarity or specifics to text and illustrations.

Caution: This information indicates the possibility of minor physical injury, component damage, data loss, and/or program corruption.

Warning: This information warns of possible serious physical injury, component damage, data loss, and/or program corruption.

Getting Services

Ask an Expert: https://www.adlinktech.com/en/Askanexpert

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Table of Contents

List of Figures

1. Introduction

1.1. Overview

The SP2-MTL Series open-frame panel PC is based on Intel® Core™ Ultra processors, providing flexible I/O options. The SP2-MTL Series is a compact-sized solution that offers efficient capabilities, making it easy to integrate into kiosks and panel PC applications.

1.2. Features

- High power efficiency with 14th Gen Intel® Core™ series processors (formerly Meteor Lake-H).
- Extensive I/O and function expansion through wire-to-board connectors and custom function modules.
- Comprehensive expansion and customization options for fast and easy integration with all form factors, kiosks, and all-in-one panel PC applications.
- Enhanced protection in case of sudden power outage with support for back-up battery (Optional).
- Pre-compliance EMC testing and high ESD tolerance.
- High reliability in case of power fluctuation, with an optional 9V-36V DC voltage range.
- Simple cabling with optional Power Over Ethernet (60W).
- Supports up to 4 displays, including integrated panel, DisplayPort, Mini DisplayPort, and USB Type-C (Optional).

1.3. Package Contents

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from your dealer before returning any products to ADLINK.

Ensure that the following items are included in the package.

- 1x SP2-MTL Series Smart Panel

1.4. Optional Accessories

- Adapter and Power Cables

Item	PN	Remark
120W (12V 10A)	31-62163-0000-A0	
Power cable	30-21863-0000-A0	Connecting between adapter and mainboard

Item	PN	Remark
SP2/OM-215_Clip_Kits	91-95337-0010	With 17 pcs clips
SP2/OM-156_Clip_Kits	91-95337-1010	With 14 pcs clips
SP2/OM-101_Clip_Kits	91-95337-2010	With 8 pcs clips

Item	PN	Remark
SP2-MTL_215 Rear cover	91-95394-100E	
SP2-MTL_101/156 Rear cover	91-9539-100E	
VESA bracket	91-95240-0010	The VESA bracket screws on rear cover

- Wireless modules

Item	Part Number
Wi-Fi kit – ENL-R8852BE	91-95266-400E
LTE module	91-95277-0010

- Connector Cables

Item	PN	Remark
USB 2.0 cable	30-21348-0000-A0	Wafer to wafer
USB 2.0 dongle	30-21401-0000-A0	Wafer to USB type A female
Audio Mic/Line Out Jack cable	30-22087-0000-A0	Wafer to 2x 3.5φ phone Jack
Power/Reset buttons, LED notification	30-21350-0000-A0	Wafer to 2x buttons and 1x LED
SPI		Wafer to open end cables
Power switch	30-21429-0020-A0	Wafer to power switch
LED cable	30-22249-0000-A0	Wafer to LEDs
GPIO cable	30-21352-0000-A0	Wafer to open cables
I2C cable	30-21353-0000-A0	Wafer to open cables
COM port	30-21862-0010-A0	Wafer to 1x DB9
Buzzer	23-52111-0A00	Wafer to 1x buzzer
Fan	32-00086-3000-A0	Wafer to 1x 12V fan

- Thermal Parts

Item	PN	Remark
Fan	32-00086-3000-A0	Wafer to 1x 12V fan
Fan with heatsink	TBD	1x heatsink, 1x bracket, 1x fan, 4x screws

2. Block Diagram

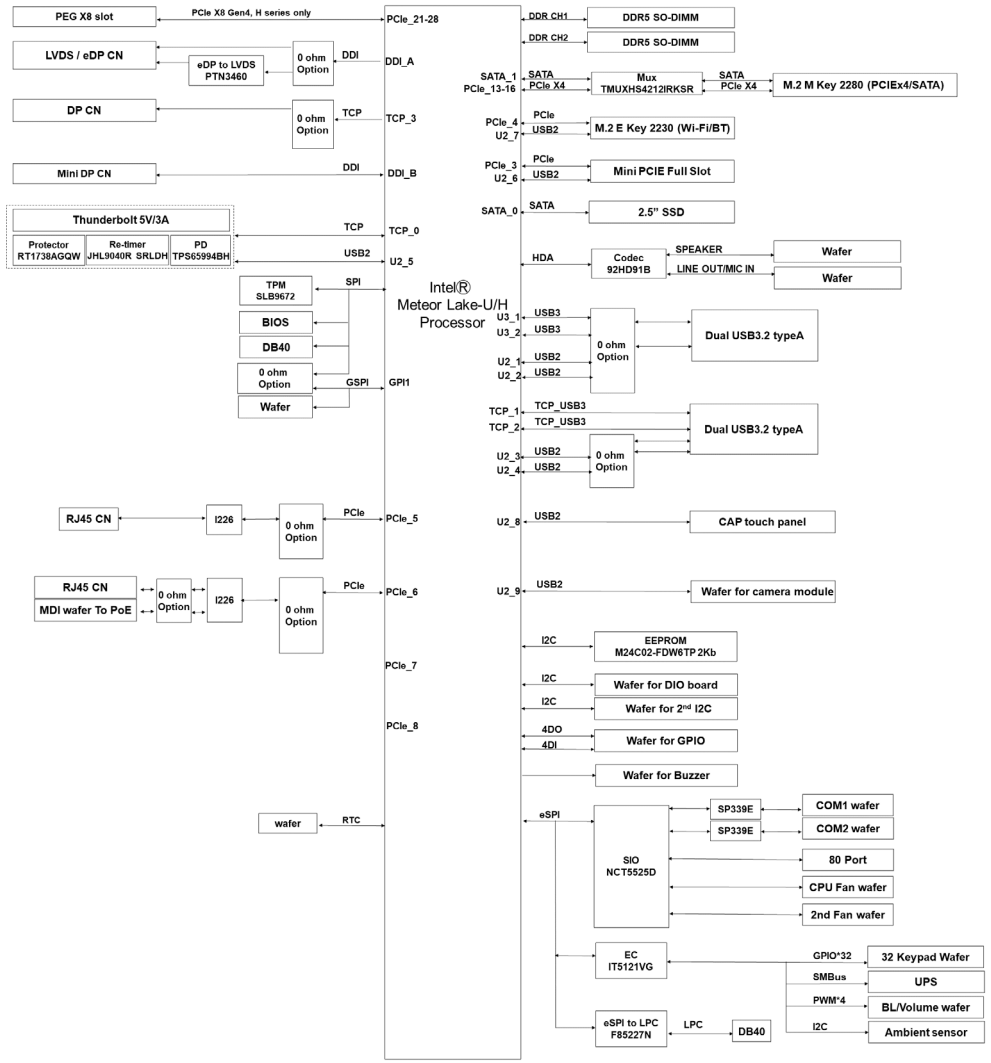


Figure 1 – Module function diagram

3. Specifications

Model	SP2-10WP-MTL	SP2-15WP-MTL	SP2-21WP-MTL
Processor	Core Ultra 5 processor 125H, 4.50GHz or Core Ultra 7 processor 155H, 4.80GHz	Core Ultra 5 processor 125H, 4.50GHz or Core Ultra 7 processor 155H, 4.80GHz	Core Ultra 5 processor 125H, 4.50GHz or Core Ultra 7 processor 155H, 4.80GHz
Memory	2x SODIMM socket, DDR5 5600MHz	2x SODIMM socket, DDR5 5600MHz	2x SODIMM socket, DDR5 5600MHz
Storage	1x M.2 SATA M key 2280, support SATA SSD and NVME (PCIe x4) 1x 2.5" SSD/HDD SATA 6 Gbps port	1 x M.2 SATA M key 2280, support SATA SSD and NVME (PCIe x4) 1x 2.5" SSD/HDD SATA 6 Gbps port	1x M.2 SATA M key 2280, support SATA SSD and NVME (PCIe x4) 1x 2.5" SSD/HDD SATA 6 Gbps port
Display and Touch			
Size	10.1"	15.6"	21.5"
Resolution	1280 x 800	1920 x 1080	1920 x1080
Contrast Ratio	800:1	1000:1	1000:1
Brightness (Nits)	400 cd/m2 (typ.)	400 cd/m2 (typ.)	400 cd/m2 (typ.)
Backlight Life (hrs.)	50,000	50,000	50,000
Viewing Angle (U/D/R/L)	89/89/89/89	89/89/89/89	89/89/89/89
Touch Points	10 Points	10 Points	10 Points
Touch Structure	Glass/Glass	Glass/Glass	Glass/Glass
Surface Hardness	7H	7H	7H
Surface Treatment	Anti-Fingerprint coating	Anti-Fingerprint coating	Anti-Fingerprint coating
External I/O			
Ethernet	2x GbE (Intel® I226), RJ-45, WOL (optional TSN support)	2x GbE (Intel® I226), RJ-45, WOL (optional TSN support)	2x GbE (Intel® I226), RJ-45, WOL (optional TSN support)
USB Ports	4x USB 3.2, Gen 2 (10 Gbps), OCP, Type A 1x Thunderbolt, Type C (optional)	4x USB 3.2, Gen 2 (10 Gbps), OCP, Type A 1x Thunderbolt, Type C (optional)	4x USB 3.2, Gen 2 (10 Gbps), OCP, Type A 1x Thunderbolt, Type C (optional)
DisplayPort	1x DisplayPort, DP++, supports DP 1.4, resolutions up to 5120x3200@60Hz 24bpp 1x MiniDisplayPort, DP++, supports DP 1.4, resolutions up to 5120x3200@60Hz 24bpp (BOM optional)	1x DisplayPort, DP++, supports DP 1.4, resolutions up to 5120x3200@60Hz 24bpp 1x MiniDisplayPort, DP++, supports DP 1.4, resolutions up to 5120x3200@60Hz 24bpp (BOM optional)	1x DisplayPort, DP++, supports DP 1.4, resolutions up to 5120x3200@60Hz 24bpp 1x MiniDisplayPort, DP++, supports DP 1.4, resolutions up to 5120x3200@60Hz 24bpp (BOM optional)
Internal I/O with Wire to Board Connectors			
USB Port	1x USB 2.0 client, wafer	1x USB 2.0 client, wafer	1x USB 2.0 client, wafer
COM Port	2x RS-232/422/485 programmable, auto flow (wire to connectors)	2x RS-232/422/485 programmable, auto flow (wire to connectors)	2x RS-232/422/485 programmable, auto flow (wire to connectors)

I^2C	2x for I2C client	2x for I2C client	2x for I2C client
Audio (Optional)	1x for 2x stereo speaker (2 watts) 1x Mic-in and Line-out 1x buzzer	1x for 2x stereo speaker (2 watts) 1x Mic-in and Line-out 1x buzzer	1x for 2x stereo speaker (2 watts) 1x Mic-in and Line-out 1x buzzer
Keys	1x for 32 physical keys (BOM optional), 1x LCD backlight up/down and volume up/down (BOM optional)	1x for 32 physical keys (BOM optional), 1x LCD backlight up/down and volume up/down (BOM optional)	1x for 32 physical keys (BOM optional), 1x LCD backlight up/down and volume up/down (BOM optional)
GPIO	1x 8-pin GPIO	1x 8-pin GPIO	1x 8-pin GPIO
mPCIe	1x full size mPCIe slot	1x full size mPCIe slot	1x full size mPCIe slot
M.2 2230 slot	1x M.2 2230 E key for wireless (Wi-Fi/Bluetooth)	1x M.2 2230 E key for wireless (Wi-Fi/Bluetooth)	1x M.2 2230 E key for wireless (Wi-Fi/Bluetooth)
Power/Reset	1x Power (with LED) 1x Reset button	1x Power (with LED) 1x Reset button	1x Power (with LED) 1x Reset button
Power			
Power Input	AT/ATX (default: AT mode) 12V ±5%, (optional: 9-36VDC), both with OVP/UVP protection	AT/ATX (default: AT mode) 12V ±5%, (optional: 9-36VDC), both with OVP/UVP protection	AT/ATX (default: AT mode) 12V ±5%, (optional: 9-36VDC), both with OVP/UVP protection
Power Connector	1x 6-pin power connector	1x 6-pin power connector	1x 6-pin power connector
Power/Fail Reset	1x wafer supports system reset, power button and power LED	1x wafer supports system reset, power button and power LED	1x wafer supports system reset, power button and power LED
Backup Battery	1x wafer for UPS kit to back up data when AC shuts down (optional)	1x wafer for UPS kit to back up data when AC shuts down (optional)	1x wafer for UPS kit to back up data when AC shuts down (optional)
Environmental			
Temperature	Operating: 0°C to 55°C Storage: -20°C to 70°C	Operating: 0°C to 55°C Storage: -20°C to 70°C	Operating: 0°C to 55°C Storage: -20°C to 70°C
Humidity	Up to 95%	Up to 95%	Up to 95%
Vibration	OP 1 Grms, 5-500Hz w/ SSD, (IEC60068-2-64) X, Y, Z axes, 60 min/axis	OP 1 Grms, 5-500Hz w/ SSD, (IEC60068-2-64) X, Y, Z axes, 60 min/axis	OP 1 Grms, 5-500Hz w/ SSD, (IEC60068-2-64) X, Y, Z axes, 60 min/axis
Shock	OP 20G peak acceleration, 11 ms (IEC60068-2-64) ±X, ±Y, ±Z, 3 shocks/axis	OP 20G peak acceleration, 11 ms (IEC60068-2-64) ±X, ±Y, ±Z, 3 shocks/axis	OP 20G peak acceleration, 11 ms (IEC60068-2-64) ±X, ±Y, ±Z, 3 shocks/axis
IP Rating	IP65 front panel	IP65 front panel	IP65 front panel
ESD	Air: ±15kV, Contact: ±8kV	Air: ±15kV, Contact: ±8kV	Air: ±15kV, Contact: ±8kV
EMC Certifications	CE/FCC class B EN 55032:2015 + A11:2020; EN 55035:2017 + A11:2020; BS EN 55032:2015 + A11:2020; BS EN 55035:2017	CE/FCC class B EN 55032:2015 + A11:2020; EN 55035:2017 + A11:2020; BS EN 55032:2015 + A11:2020; BS EN 55035:2017	CE/FCC class B EN 55032:2015 + A11:2020; EN 55035:2017 + A11:2020; BS EN 55032:2015 + A11:2020; BS EN 55035:2017

	+ A11:2020; AS/NZS CISPR 32:2015 + A1:2020 EN 60601-1-2:2015 + A1:2021; IEC 60601-1-2:2014 + A1:2020 BS EN 60601-1-2:2015 + A1:2021 IEC/EN 61000-3-2, IEC/EN 61000-3-3	+ A11:2020; AS/NZS CISPR 32:2015 + A1:2020 EN 60601-1-2:2015 + A1:2021; IEC 60601-1-2:2014 + A1:2020 BS EN 60601-1-2:2015 + A1:2021 IEC/EN 61000-3-2, IEC/EN 61000-3-3	+ A11:2020; AS/NZS CISPR 32:2015 + A1:2020 EN 60601-1-2:2015 + A1:2021; IEC 60601-1-2:2014 + A1:2020 BS EN 60601-1-2:2015 + A1:2021 IEC/EN 61000-3-2, IEC/EN 61000-3-3
EMC/Safety Compliance	EN 62368-1:2014 + A11:2017	EN 62368-1:2014 + A11:2017	EN 62368-1:2014 + A11:2017
Software			
Watchdog Timer	Supported	Supported	Supported
Operating Systems	Windows ® 11 IoT Enterprise x64 bit Windows ® 10 IoT Enterprise x64 bit Ubuntu Linux 22.04 LTS	Windows ® 11 IoT Enterprise x64 bit Windows ® 10 IoT Enterprise x64 bit Ubuntu Linux 22.04 LTS	Windows ® 11 IoT Enterprise x64 bit Windows ® 10 IoT Enterprise x64 bit Ubuntu Linux 22.04 LTS
Mechanical			
Size	10.1"	15.6"	21.5"
Construction	SGCC	SGCC	SGCC
Dimensions (LXWXD)	249.66 ± 2 x 168.3 ± 2 x 64.4± 2	383.56 ± 2 x 232.99 ± 2 x 65.1± 2	517.46 ± 2 x 309.19 ± 2 x 67.6 ± 2
Package dimension	420 x 176 x 352	620x176x440	620 x 176 x 440
Mounting (Optional)	Panel Mounting VESA mounting (requires optional rear cover)	Panel Mounting VESA mounting (requires optional rear cover)	Panel Mounting VESA mounting (requires optional rear cover)

4. Mechanical Layout

All dimensions are in millimeters, unless noted.

4.1. Mechanical Dimensions

SP2-10WP-MTL

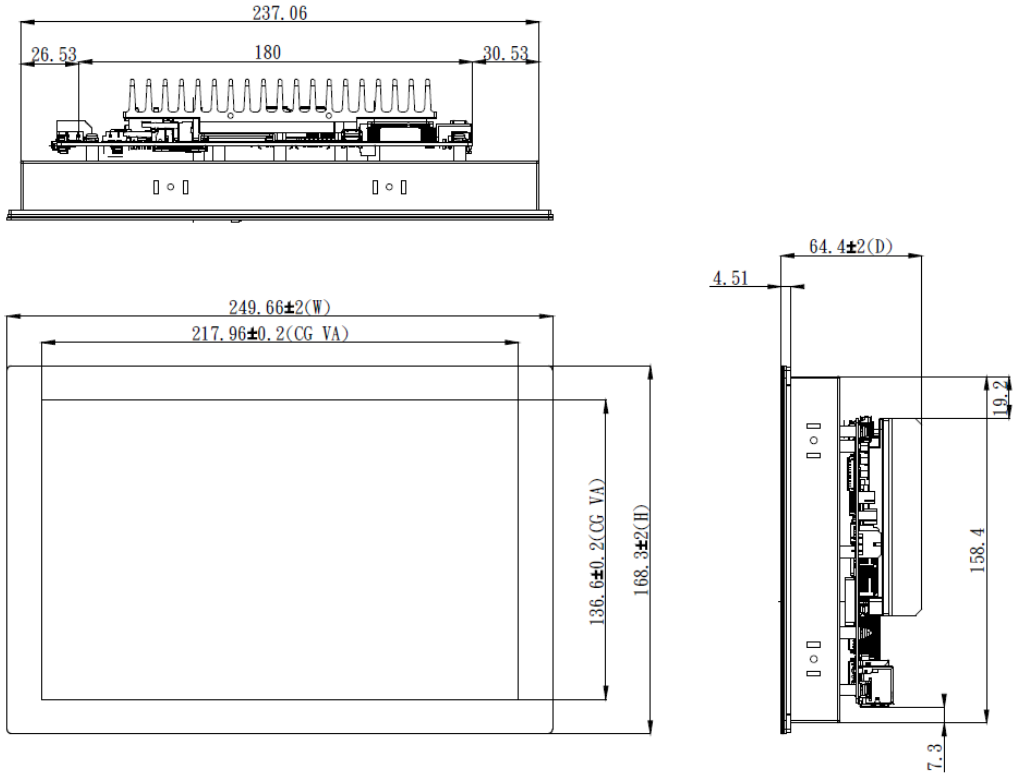


Figure 2 – SP2-10WP-MTL mechanical dimensions

SP2-15WP-MTL

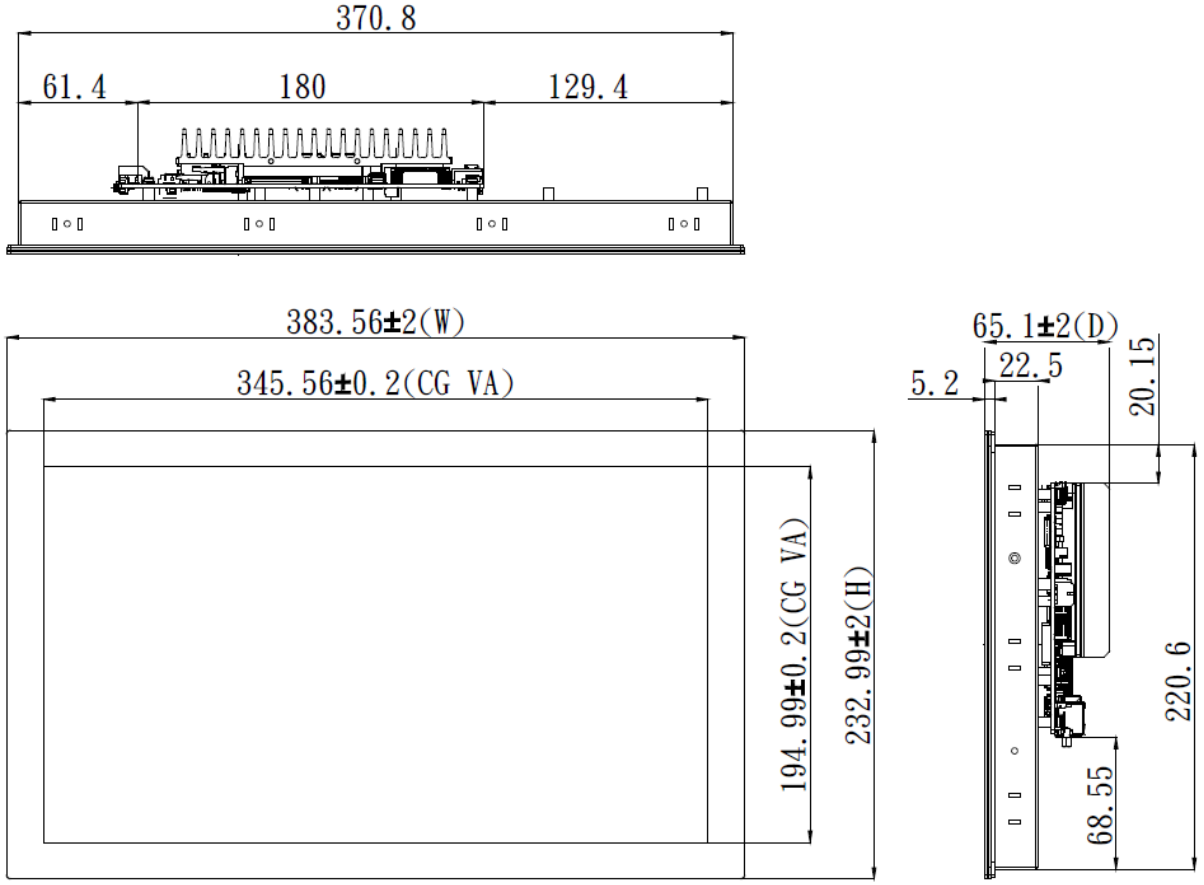


Figure 3 – SP2-15WP-MTL mechanical dimensions

SP2-21WP-MTL

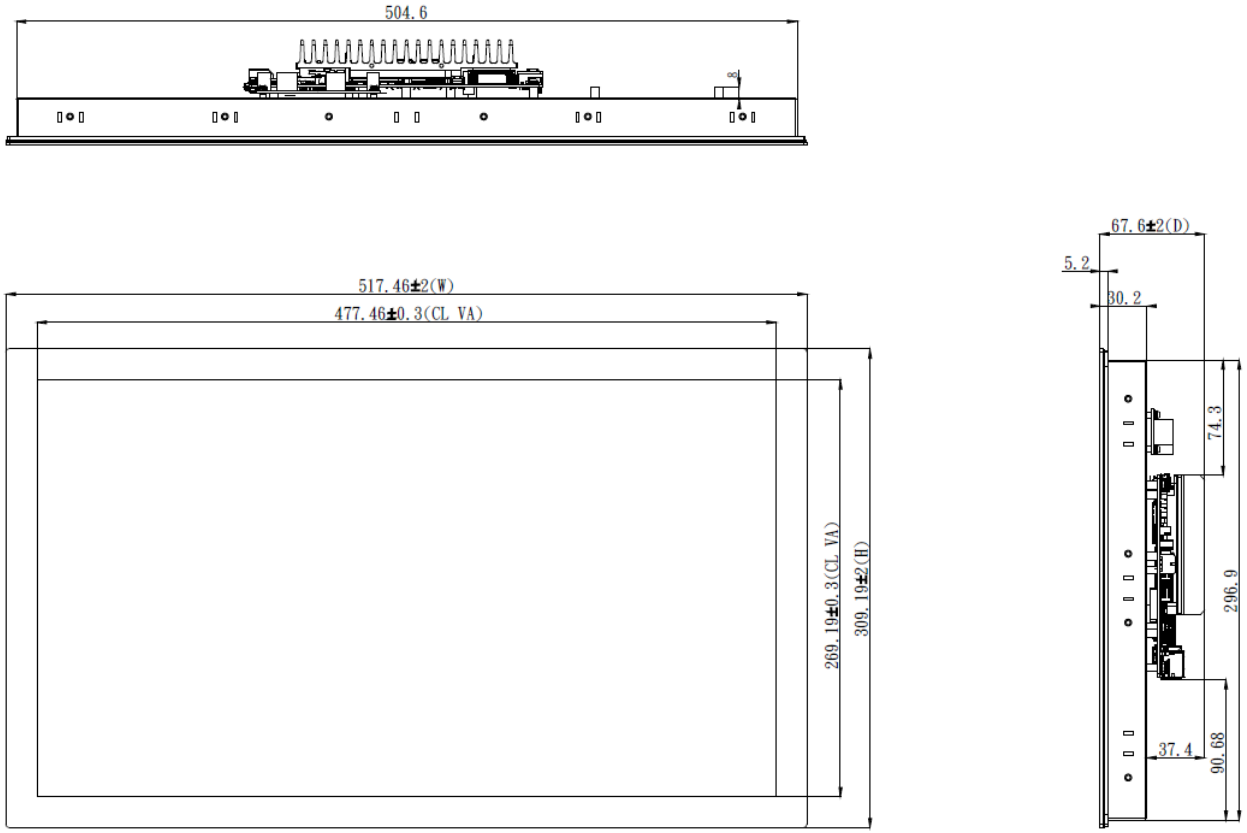


Figure 4 – SP2-21WP-MTL mechanical dimensions

4.2. I/O Panel Connector Locations

Optional Connectors:

- Mini DP, 32 keys for data input, PCIe x8, MDI for external PoE board, Type C Thunderbolt, and MDI.

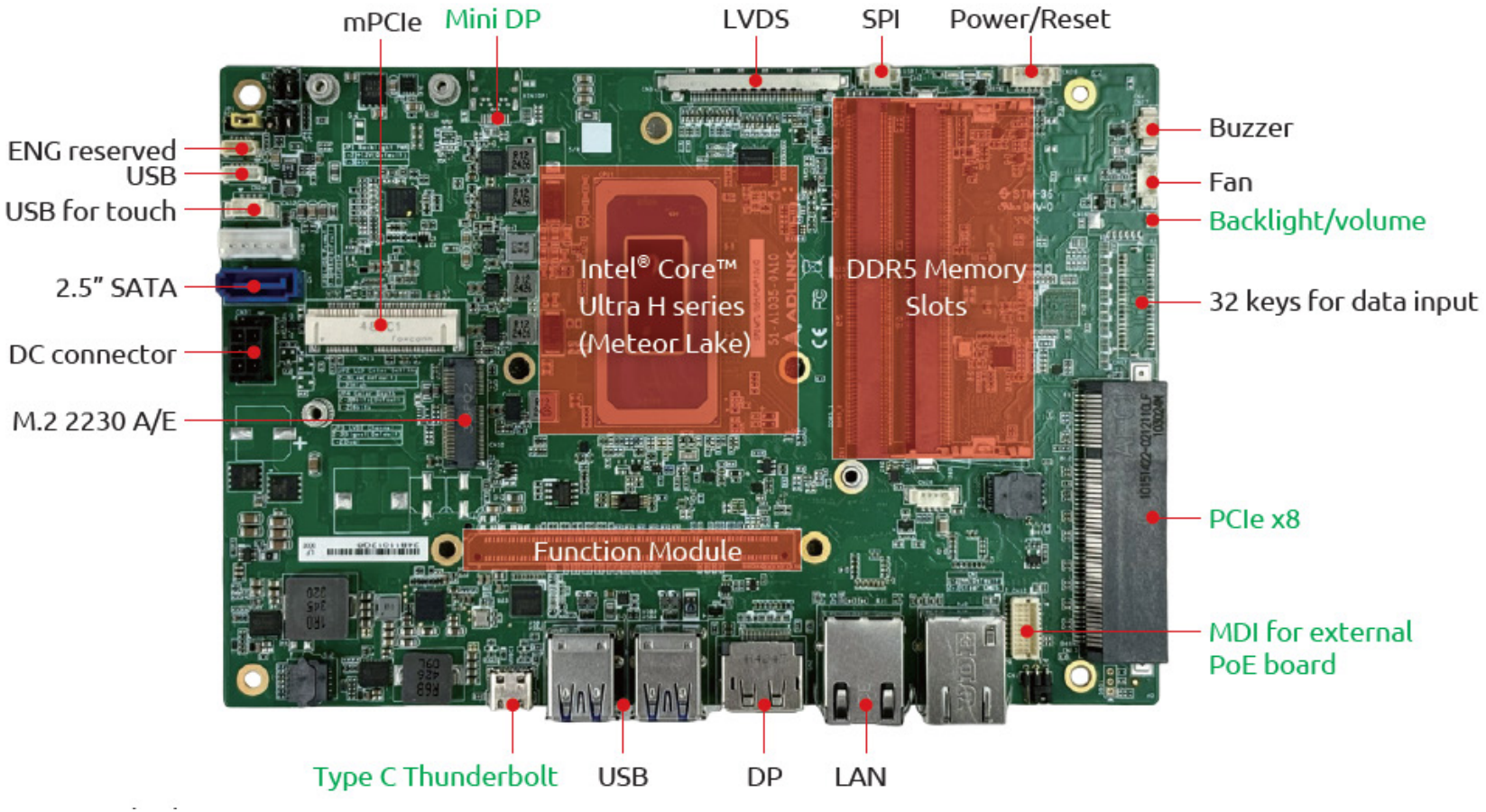


Figure 5 – I/O panel connector locations

4.3. Mainboard Connector Locations

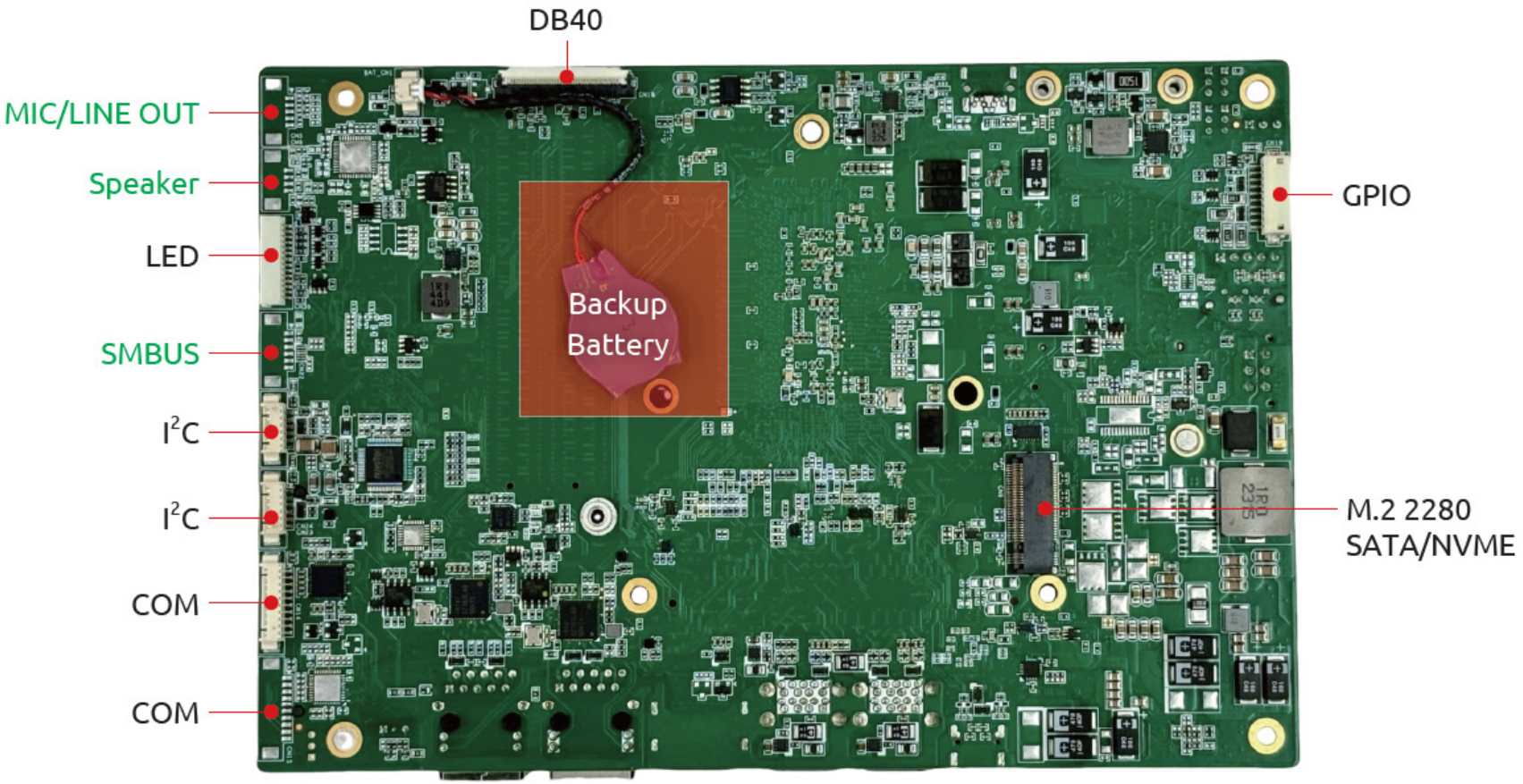


Figure 6 – Mainboard connector locations

5. Thermal Options

5.1. Heatsink Dimensions

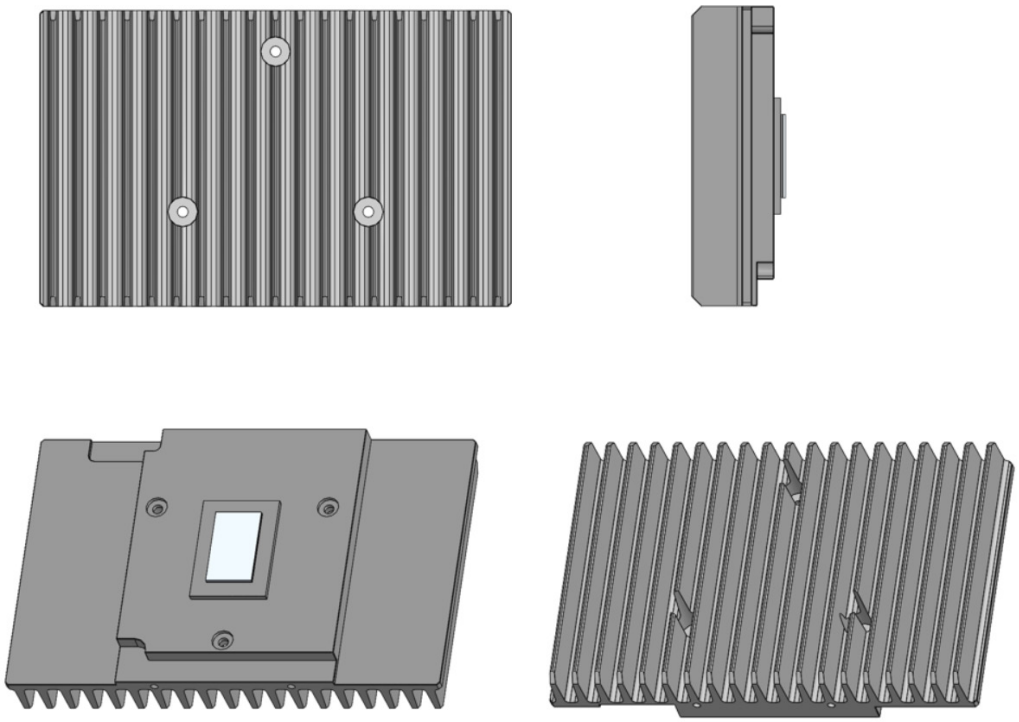


Figure 7 – Module function diagram

Note: All dimensions are in millimeters, unless noted.

Caution: Due to radiant heat from the passive heatsink, make sure the heatsink is positioned at least 10 cm from the nearest wall.

5.2. Active Cooling Heatsink

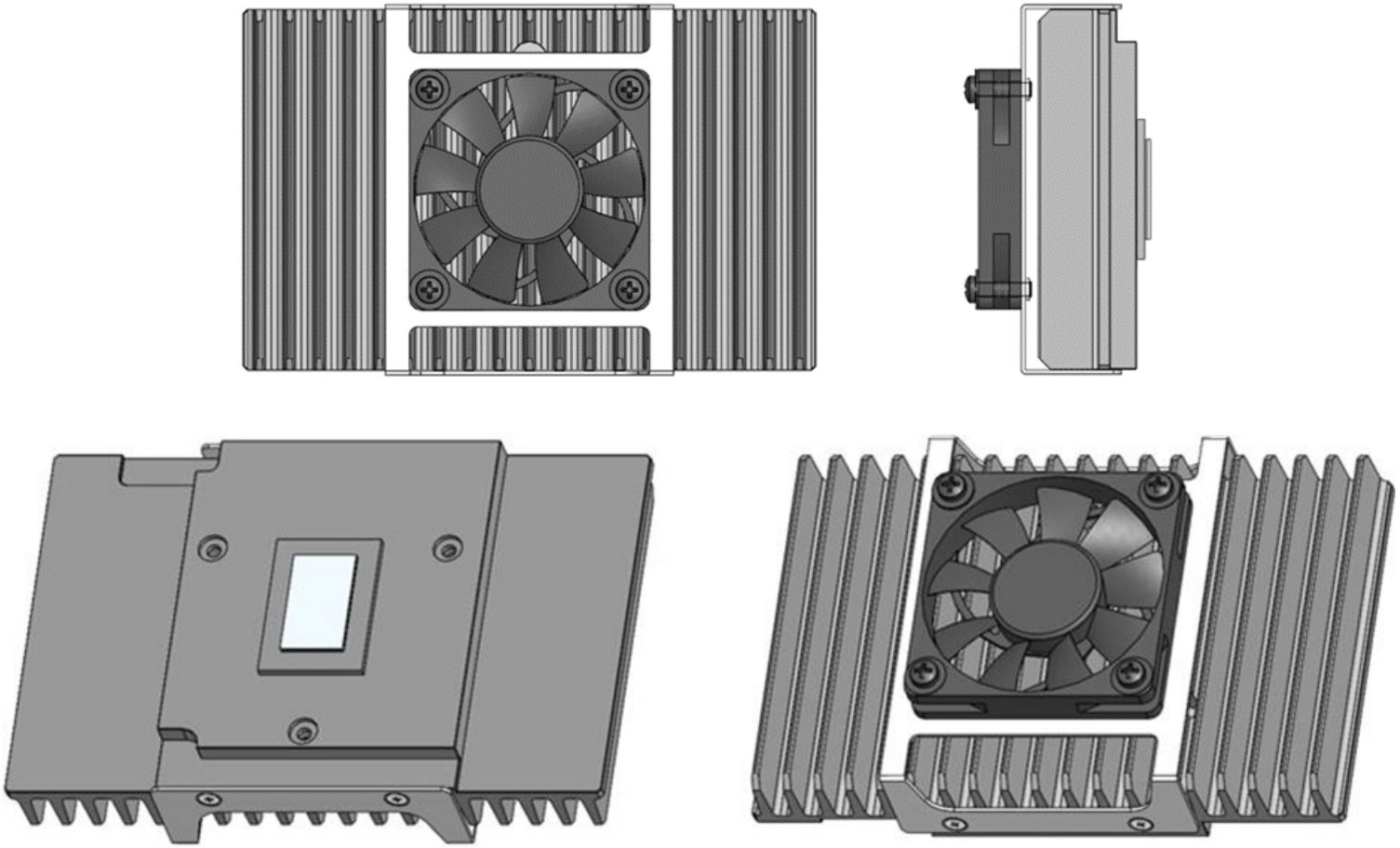


Figure 8 – Active cooling heatsink

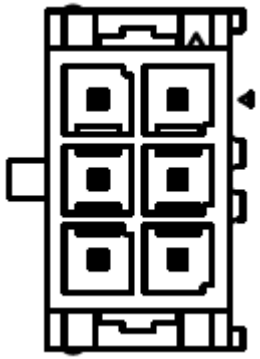
6. Pinouts and Connectors

6.1. Power Connector

The 6-pin power connector connects to an AC/DC power supply adapter, a DC-to-DC power, module, and a battery. It supports AT and ATX power modes, with AT mode controlled by the BIOS.

Pin	Signal
1	GND
2	GND
3	GND
4	PWR_CONN_IN
5	PWR_CONN_IN
6	PWR_CONN_IN

MAFG P/N	ADLINK P/N
CP3506P1V00-NH	20-65D0N-2030

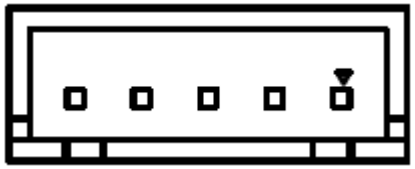


6.2. SATA Power Connector

The SATA power connector provides power to an internal 2.5" HDD.

Pin	Signal
1	NC
2	GND
3	P+5V_S0
4	GND
5	P+3V3_S0

Manufacturer	MAFG P/N	ADLINK P/N
JVE	24W1170-05S10-01T-3.4-CS01	20-6520E-1050

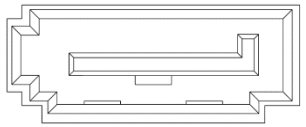


6.3. SATA Data Connector

The SATA data connector provides data connection to an internal 2.5" HDD.

Pin	Signal
1	GND
2	SATA_TX1_P
3	SATA_TX1_N
4	GND
5	SATA_RX1_N
6	SATA_RX1_P
7	GND

Manufacturer	MAFG P/N	ADLINK P/N
WIN WIN	WATM-07ABN4B3B8UW4	21-H14A0-0070



6.4. Capacitive Touch Connector

The internal USB 2.0 connector supports a capacitive touch for panel.

Pin	Signal
1	GND
2	TSC_D+
3	TSC_D-
4	P5V_U2TOU

Manufacturer	MAFG P/N	ADLINK P/N
MOLEX	53398-0471	61-69J03-1040

6.5. Mini PCIe Connector

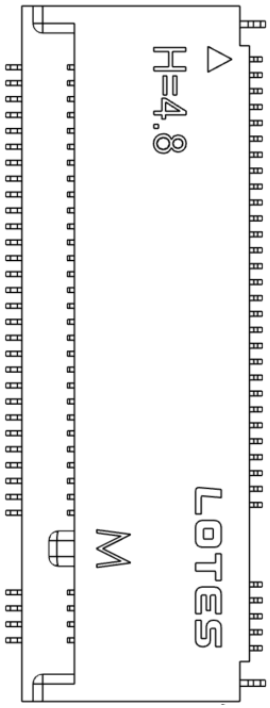
The mini PCIe connector supports standard PCIe signals such as PCIe Gen3 and USB2.0.

Pin	Signal	Pin	Signal
1	PCIE_Wake-L	2	P_+3V3_S0_mPCIe
3	TP point	4	GND
5	TP point	6	P_+1V5_S0_mPCIe
7	PCH_CLK_REQ3-L	8	X
9	GND	10	X
11	MPCIE_CLK3_N	12	X
13	MPCIE_CLK3_P	14	X
15	GND	16	X
17	X	18	GND
19	X	20	TP point
21	GND	22	PLTRST-L_MINIPCIE
23	MPCIE_RX6_N	24	P_+3V3_S0_mPCIe
25	MPCIE_RX6_P	26	GND
27	GND	28	P_+1V5_S0_mPCIe
29	GND	30	PCH_SMB_CLK_MINI
31	MPCIE_TX6_N_C	32	PCH_SMB_DAT_MINI
33	MPCIE_TX6_P_C	34	GND
35	GND	36	USB_MINIPCIE_N
37	GND	38	USB_MINIPCIE_P
39	P_+3V3_S0_pPCIe	40	GND
41	P_+3V3_S0_pPCIe	42	X
43	GND	44	TP point
45	X	46	X
47	X	48	P_+1V5_S0_mPCIe
49	X	50	GND
51	X	52	P_+3V3_S0_mPCIe

6.6. M.2 2230, E Key for Wi-Fi/Bluetooth Modules

The M.2 E Key supports standard PCIe signals such as PCIe Gen3 and USB2.0.

Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	P_+3V3_NGFF_E	75	GND
3	M2E_USB_P	4	P_+3V3_NGFF_E		
5	M2E_USB_N	6	NC		
7	GND	8	NC		
9	NC	10	NC		
11	NC	12	NC		
13	NC	14	NC		
15	NC	16	NC		
17	NC	18	GND		
19	NC	20	NC		
21	NC	22	NC		
23	NC	32	NC		
33	GND	34	NC		
35	PCIE2_M2E_TX_P	36	NC		
37	PCIE2_M2E_TX_N	38	NC		
39	GND	40	NC		
41	PCIE2_RX_P	42	NC		
43	PCIE2_RX_N	44	NC		
45	GND	46	NC		
47	PCIECLK1_100M_P	48	NC		
49	PCIECLK1_100M_N	50	NC		
51	GND	52	M2E_PLTRST_BUF-L		
53	PCH_CLK_REQ1-L	54	NC		
55	M2_E_PEWAKE_N	56	W_DISABLE1		
57	GND	58	PCH_SMB_DAT_A		
59	NC	60	PCH_SMB_CLK_A		
61	NC	62	GP_C02_SMB_ALERT-		
63	GND	64	NC		
65	NC	66	NC		
67	NC	68	NC		
69	GND	70	NC		
71	NC	72	P_+3V3_NGFF_E		
73	NC	74	P_+3V3_NGFF_E		



6.7. Function Module Board Connector

The function module allows customized expandability of the device. Contact your ADLINK representative for details.

Pin	Signal	Pin	Signal
1	P_+12V_A	2	P_+12V_A
3	P_+12V_A	4	P_+12V_A
5	GND	6	GND
7	GND	8	GND
9	P_+5V_A	10	P_+5V_A
11	P_+5V_A	12	P_+5V_A
13	GND	14	GND
15	GND	16	GND
17	P_+3V3_A	18	P_+3V3_A
19	P_+3V3_A	20	P_+3V3_A
21	GND	22	GND
23	GND	24	GND
25	PCH_SLP_S3-L	26	PCH_I2C1_DAT_3V3
27	PCH_PCIE_FM_WAKE-L	28	PCH_I2C1_CLK_3V3
29	GND	30	FM_PRESET-L
31	SOC_FM_PCIECLK2_P	32	PLTRST-L_FM
33	SOC_FM_PCIECLK2_N	34	GND
35	GND	36	PCH_SMB_ALERT_N_3V3
37	SOC_FM_PCIE_RX5_P	38	PCH_SMB_DAT_A
39	SOC_FM_PCIE_RX5_N	40	PCH_SMB_CLK_A
41	GND	42	GND
43	SOC_FM_PCIE_TX5_P	44	FM_U3_TX1_P
45	SOC_FM_PCIE_TX5_N	46	FM_U3_TX1_N
47	GND	48	GND
49	SOC_FM_PCIECLK3_P	50	FM_U3_RX1_P
51	SOC_FM_PCIECLK3_N	52	FM_U3_RX1_N
53	GND	54	GND
55	SOC_FM_PCIE_RX6_P	56	FM_U2_P1_P
57	SOC_FM_PCIE_RX6_N	58	FM_U2_P1_N
59	GND	60	GND
61	SOC_FM_PCIE_TX6_P	62	FM_U3_TX2_P
63	SOC_FM_PCIE_TX6_N	64	FM_U3_TX2_N
65	GND	66	GND

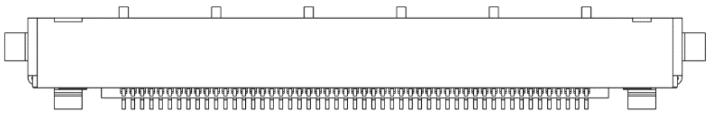
67	SOC_FM_PCIECLK4_P	68	FM_U3_RX2_P
69	SOC_FM_PCIECLK4_N	70	FM_U3_RX2_N
71	GND	72	GND
73	SOC_FM_PCIE_RX7_P	74	FM_U2_P2_P
75	SOC_FM_PCIE_RX7_N	76	FM_U2_P2_N
77	GND	78	GND
79	SOC_FM_PCIE_TX7_P	80	FM_U2_P3_P
81	SOC_FM_PCIE_TX7_N	82	FM_U2_P3_N
83	GND	84	GND
85	SOC_FM_PCIECLK5_P	86	FM_U2_P4_P
87	SOC_FM_PCIECLK5_N	88	FM_U2_P4_N
89	GND	90	GND
91	SOC_FM_PCIE_RX8_P	92	FM_ESPI_LPC_0
93	SOC_FM_PCIE_RX8_N	94	FM_ESPI_LPC_1
95	GND	96	FM_ESPI_LPC_2
97	SOC_FM_PCIE_TX8_P	98	FM_ESPI_LPC_3
99	SOC_FM_PCIE_TX8_N	100	FM_ESPI_CS1_LPC_FRAME-L
101	GND	102	FM_ESPI_CLK_LPC_CLK
103	PCH_CLK_REQ_P4_N_3V3	104	FM_ESPI_ALERT1-L_LPC_SERIRQ
105	PCH_CLK_REQ_P5_N_3V3	106	FM_ESPI_RESET-L_LPC_DRQ
107	GND	108	GND
109	FM_TCP2_TX0_P	110	I2S1_TXD_TCP2_LSK_TXD
111	FM_TCP2_TX0_N	112	I2S1_RXD_TCP2_LSK_RXD
113	GND	114	I2S1_SFRM
115	FM_TCP2_TX1_P	116	I2S1_SCLK_PCH_SML0_DAT
117	FM_TCP2_TX1_N	118	I2S1_MCLK_PCH_SML0_CLK
119	GND	120	GND
121	FM_TCP2_TX2_P	122	USB_OC1_N
123	FM_TCP2_TX2_N	124	USB_OC3_N
125	GND	126	GND
127	FM_TCP2_TX3_P	128	FM_GPIO0
129	FM_TCP2_TX3_N	130	FM_GPIO1
131	GND	132	FM_GPIO2
133	FM_TCP2_I2CCLK_AUX_P_CN	134	GPIO3_SPICS1_MUX
135	FM_TCP2_I2CDAT_AUX_N_CN	136	GPIO4_FIN_IN_MUX
137	GND	138	GPIO3_FIN_OUT_MUX
139	FM_TCP2_DDC_AUX_SEL_CN	140	FM_SPI_MISO

141	FM_TCP2_DDI1_HPD	142	FM_SPI_MOSI
143	GND	144	FM_SPI_CS#
145	PCH_I2C2_DAT_3V3	146	FM_SPI_CLK
147	PCH_I2C2_CLK_3V3	148	GND
149	FM_I2C2_INT_3V3	150	UART_SOC_RI_N

6.8. LVDS/e-DP Connector

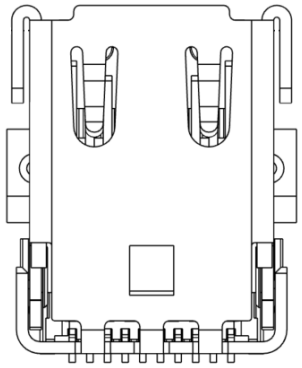
The LVDS/eDP allows internal connection to a display. LVDS/eDP settings are controlled by BOM optional.

Pin	Signal	Pin	Signal	Pin	Signal
1	BLWR_12V_5V_CN	24	GND	47	LVDS_B1N_1
2	BLWR_12V_5V_CN	25	LVDS_ACKP_1	48	GND
3	BLWR_12V_5V_CN	26	LVDS_ACKN_1	49	LVDS_B0P_1
4	BLWR_12V_5V_CN	27	GND	50	LVDS_B0N_1
5	CN_LVDS_BKLT_PWM	28	LVDS_A2P_1	51	GND
6	CN2_LVDS_BKLT_EN	29	LVDS_A2N_1		
7	GND	30	GND		
8	GND	31	LVDS_A1P_1		
9	GND	32	LVDS_A1N_1		
10	GND	33	GND		
11	LCD_V_DET_eDP	34	LVDS_A0P_1		
12	G_EDP_HPDA	35	LVDS_A0N_1		
13	LCD_SEL68_CN	36	GND		
14	G_LVDS_I2C_CLK_CN	37	LVDS_B3P_1		
15	G_LVDS_I2C_DAT_CN	38	LVDS_B3N_1		
16	LCD_LVDS_12V	39	GND		
17	LCD_LVDS_12V	40	LVDS_BCKP_1		
18	GND	41	LVDS_BCKN_1		
19	LCD_LVDS_3V3-5V	42	GND		
20	LCD_LVDS_3V3-5V	43	LVDS_B2P_1		
21	GND	44	LVDS_B2N_1		
22	LVDS_A3P_1	45	GND		
23	LVDS_A3N_1	46	LVDS_B1P_1		



6.9. Mini DP Connector

Pin	Signal	Pin	Signal
1	GND	11	CON_DDIB_TX1_N
2	CON_DDIB_HPD	12	CON_DDIB_TX3_N
3	CON_DDIB_TX0_P	13	GND
4	CON_DDIB_DDC_AUX_SEL	14	GND
5	CON_DDIB_TX0_N	15	CON_DDIB_TX2_P
6	GND	16	CON_DDIB_I2CCLK_AUX_P
7	GND	17	CON_DDIB_TX2_N
8	GND	18	CON_DDIB_ I2CCLK_AUX_N
9	CON_DDIB_TX1_P	19	GND
10	CON_DDIB_TX3_P	20	P_+3V3_MDP



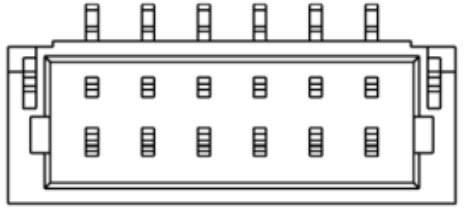
6.10. Internal USB2.0 Wafer

This internal USB 2.0 connector facilitates connection of a camera to the device.

*Manufacturer details TBD

Pin	Signal
1	P5V_U2_CAM
2	CN_U2_P9_N
3	CN_U2_P9_P
4	GND
5	NC
6	NC

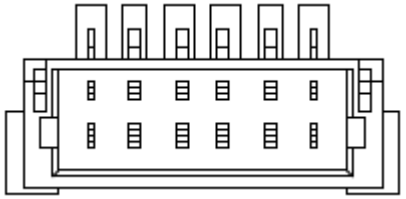
Manufacturer	MAFG P/N	ADLINK P/N
CST	CSI-1181-061R-NH	61-65520-1060



6.11. GSPI Wafer

Pin	Signal
1	GSPI_TOUCH_INT-L_3V3
2	PCH_GSPI1_MISO_3V3
3	PCH_GSPI1_MOSI_3V3
4	PCH_GSPI1_CSO-L_3V3
5	PCH_GSPI1_CLK_3V3
6	GND

Manufacturer	MAFG P/N	ADLINK P/N
CST	CSI-1181-061R-NH	61-65520-1060

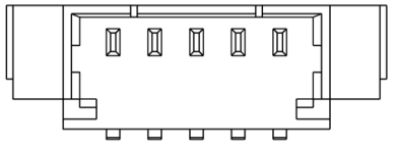


6.12. PWR/RST Wafer

Connects to power, reset button, and power LED via cable.

Pin	Signal
1	P_+3V3_A
2	PWRBTN-L_R
3	SYS_RESET-L_R
4	SIG_PWRLED-L
5	GND

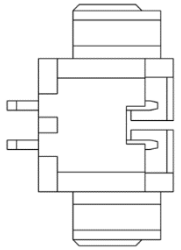
Manufacturer	MAFG P/N	ADLINK P/N
MOLEX	53398-0571	61-69J03-0050



6.13. Buzzer Wafer

Pin	Signal
1	P_+5V_S0
2	A_SPKR_1V8

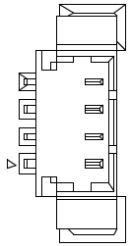
Manufacturer	MAFG P/N	ADLINK P/N
JVE	24W1125A-02M00-01T-1-CF01	61-6AJ0X-1020



6.14. MXM Fan Wafer

Pin	Signal
1	GND
2	FAN_PWR_IN2 (12V)
3	SIO_FANIN2_CN
4	SIO_PWM_DAC2_CN

Manufacturer	MAFG P/N	ADLINK P/N
MOLEX	53398-0471	61-69J03-1040



6.15. Volume/Backlight Wafer

Controls volume and adjusts display brightness.

Pin	Signal
1	P_+3V3_S0
2	EC_BTN_33
3	EC_BTN_34
4	EC_BTN_35
5	EC_BTN_36
6	GND

Manufacturer	MAFG P/N	ADLINK P/N
JVE	24W1125A-06S10-01T-0.5-CF01	61-69J0X-1060

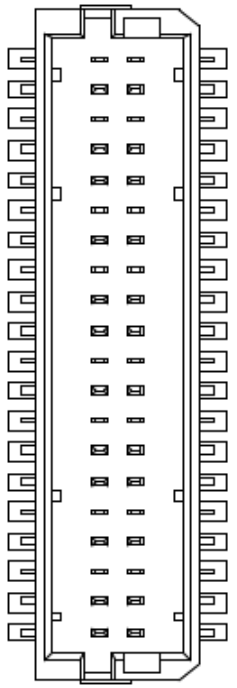
6.16. 33 Keypad Wafer

The key connector supports 32 physical keys and 5 control keys with the following default values:

- Directions: ↑, ↓, ←, →
- Numbers: 0 to 9
- Functions: Enter, ESC, TAB, Backspace, Delete, Clear, Page Up, Page Dwn
- Hot keys: F1 – F10

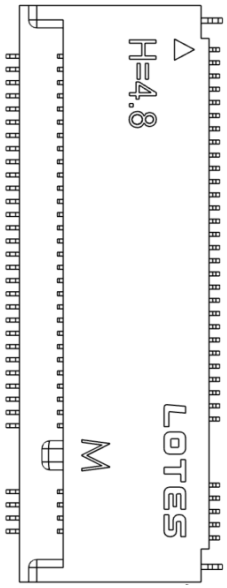
Manufacturer	MAFG P/N	ADLINK P/N
HIROSE	DF20EF-40DP-1V(52)	61-61002-2200

Pin	Signal	Function Value	Pin	Signal	Function Value
1	GND	N/A	2	P_+3V3_S0	N/A
3	EC_BTN_17	Tab	4	EC_BTN_1	↑
5	EC_BTN_18	Backspace	6	EC_BTN_2	↓
7	EC_BTN_19	Delete	8	EC_BTN_3	→
9	EC_BTN_20	Space	10	EC_BTN_4	←
11	EC_BTN_21	Page Up	12	EC_BTN_5	0
13	EC_BTN_22	Page Down	14	EC_BTN_6	1
15	EC_BTN_23	F1	16	EC_BTN_7	2
17	EC_BTN_24	F2	18	EC_BTN_8	3
19	EC_BTN_25	F3	20	EC_BTN_9	4
21	EC_BTN_26	F4	22	EC_BTN_10	5
23	EC_BTN_27	F5	24	EC_BTN_11	6
25	EC_BTN_28	F6	26	EC_BTN_12	7
27	EC_BTN_29	F7	28	EC_BTN_13	8
29	EC_BTN_30	F8	30	EC_BTN_14	9
31	EC_BTN_31	F9	32	EC_BTN_15	Enter
33	EC_BTN_32	F10	34	EC_BTN_16	Esc
35	EC_BTN_37		36	NC	
37	NC		38	P_+3V3_A	
39	NC		40	P_+3V3_A	



6.17. PCIE X8 Gen4 Slot

Pin	Signal	Pin	Signal
A1	GF_PRSNT1-L	B1	P_+12V_S0
A2	P_+12V_S0	B2	P_+12V_S0
A3	P_+12V_S0	B3	P_+12V_S0
A4	GND	B4	GND
A5	EC_PWM_FAN	B5	PCH_SMB_CLK_3V3
A6	EC_TAC_FAN	B6	PCH_SMB_DAT_3V3
A7	PCH_SLP_S3_N_3V3	B7	GND
A8	PCH_I2C4_DAT_3V3	B8	P_+3V3_S0
A9	P_+3V3_S0	B9	PCH_I2C4_CLK_3V3
A10	P_+3V3_S0	B10	P_+3V3_A
A11	PCIEX8GF_PERST-L	B11	PCIE_X8_WAKE-L
A12	GND	B12	NC
A13	C_REFCLK_P6_100M_P	B13	GND
A14	C_REFCLK_P6_100M_N	B14	PCIE21_TX_P_C
A15	GND	B15	PCIE21_TX_N_C
A16	PCIE21_RX_P_C	B16	GND
A17	PCIE21_RX_N_C	B17	GF_PRSNT2-L
A18	GND	B18	GND
A19	NC	B19	PCIE22_TX_P_C
A20	GND	B20	PCIE22_TX_N_C
A21	PCIE22_RX_P_C	B21	GND
A22	PCIE22_RX_N_C	B22	GND
A23	GND	B23	PCIE23_TX_P_C
A24	GND	B24	PCIE23_TX_N_C
A25	PCIE23_RX_P_C	B25	GND
A26	PCIE23_RX_N_C	B26	GND
A27	GND	B27	PCIE24_TX_P_C
A28	GND	B28	PCIE24_TX_N_C
A29	PCIE24_RX_P_C	B29	GND
A30	PCIE24_RX_N_C	B30	NC
A31	GND	B31	GF_PRSNT2-L
A32	PCIEX8_GPIO0_3V3	B32	GND
A33	PCIEX8_GPIO1_3V3	B33	PCIE25_TX_P_C
A34	GND	B34	PCIE25_TX_N_C

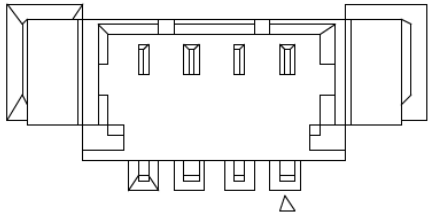


A35	PCIE25_RX_P_C	B35	GND
A36	PCIE25_RX_N_C	B36	GND
A37	GND	B37	PCIE26_TX_P_C
A38	GND	B38	PCIE26_TX_N_C
A39	PCIE26_RX_P_C	B39	GND
A40	PCIE26_RX_N_C	B40	GND
A41	GND	B41	PCIE27_TX_P_C
A42	GND	B42	PCIE27_TX_N_C
A43	PCIE27_RX_P_C	B43	GND
A44	PCIE27_RX_N_C	B44	GND
A45	GND	B45	PCIE28_TX_P_C
A46	GND	B46	PCIE28_TX_N_C
A47	PCIE28_RX_P_C	B47	GND
A48	PCIE28_RX_N_C	B48	GF_PRSNT2-L
A49	GND	B49	GND

6.18. CPU Fan Wafer

Pin	Signal
1	GND
2	FAN_PWR_IN (12V)
3	SIO_FANIN1_CN
4	SIO_PWM_DAC1_CN

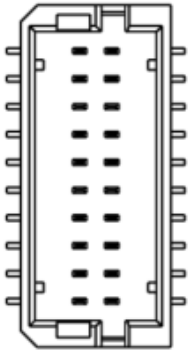
Manufacturer	MAFG P/N	ADLINK P/N
MOLEX	53398-0471	61-69J03-1040



6.19. LAN2 PD Wafer

Supports an additional GbE LAN port via cable/dongle to RJ45 connector.

Pin	Signal	Pin	Signal
1	L_GBE2_MDI2_P_PD	2	L_GBE2_MDI0_P_PD
3	L_GBE2_MDI2_N_PD	4	L_GBE2_MDI0_N_PD
5	GND	6	GND
7	L_GBE2_MDI3_P_PD	8	L_GBE2_MDI1_P_PD
9	L_GBE2_MDI3_N_PD	10	L_GBE2_MDI1_N_PD
11	GND	12	GND
13	P_+3V3+I226_B	14	P_+3V3+I226_B
15	L_GBE2_LED0_1000-L	16	L_GBE2_LED1_LINK/ACT-L
17	NC	18	NC
19	GND	20	GND

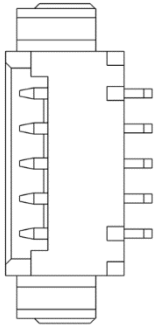


6.20. Line Out/Mic In Wafer

Supports Mic in/line out, connecting to peripherals via cable.

Pin	Signal
1	CON_MIC1_IN
2	CON_LINE1_OUT_L
3	CON_LINE1_OUT_R
4	LINE1_OUT_JD
5	AGND_AUDIO

Manufacturer	MAFG P/N	ADLINK P/N
JVE	24W1125A-05M00-01T-1-CF01	61-6AJ0X-1050

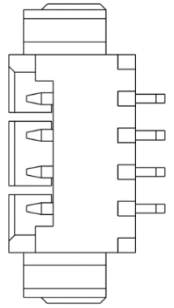


6.21. Speaker Wafer

Supports 2x 2-watt speakers.

Pin	Signal
1	AMP_L
2	AMP_L
3	AMP_R
4	AMP_R

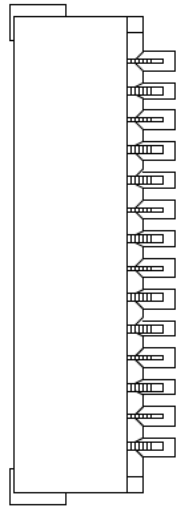
Manufacturer	MAFG P/N	ADLINK P/N
JVE	24W1125A-04M00-01T-1-CF01	61-6AJ0X-1040



6.22. LED Wafer

Pin	Signal
1	GND
2	STDBY_PWR
3	GP3_LED-L
4	GP2_LED-L
5	GP1_LED-L
6	P_+3V3_A
7	BIOS_LOAD_DEFAULT_L
8	GND
9	NC
10	NC
11	CN_SATA_LED-L_R
12	P_+3V3_S0
13	CN_WDT_LED-L
14	P_+3V3_A

Manufacturer	MAFG P/N	ADLINK P/N
CST	CSI-1182-141R	61-66500-1140

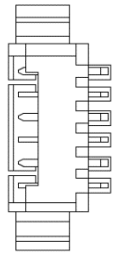


6.23. EC Smbus Wafer for UPS

The Uninterruptible Power Supply connector allows the device to interface with a UPS device for backup power in the event of power failure.

Pin	Signal
1	CHG_PWR
2	GND
3	CHG_SMBCLK
4	CHG_SMBDAT
5	SMB_ALERT-L_R
6	DCIN_DET

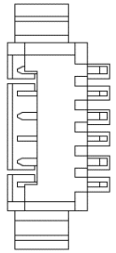
Manufacturer	MAFG P/N	ADLINK P/N
JVE	24W1125A-06M00-01T-1-CF01	61-6AJ0X-1060



6.24. SoC 1st I2C Wafer

Pin	Signal
1	P_+5V_I2C
2	P_+3V3_I2C
3	PCH_I2C4_DAT_3V3
4	PCHI_2C4_CLK_3V3
5	DIO_I2C4_INT_3V3
6	GND

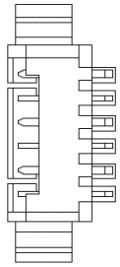
Manufacturer	MAFG P/N	ADLINK P/N
JVE	24W1125A-06M00-01T-1-CF01	61-6AJ0X-1060



6.25. SoC 2nd I2C Wafer

Pin	Signal
1	P_+5V_I2C2
2	P_+3V3_I2C2
3	2ND_SDA
4	2ND_SCL
5	2ND_INT
6	GND

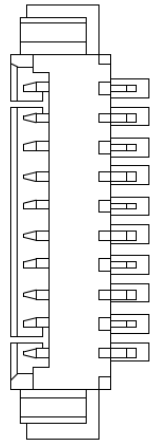
Manufacturer	MAFG P/N	ADLINK P/N
JVE	24W1125A-06M00-01T-1-CF01	61-6AJ0X-1060



6.26. COM Port 1 Wafer

Pin	Signal	RS232	RS422	RS485
1	COM1_DCD-L_CN	DCD#	TXD422	485DATA
2	COM1_RXD_CN	RXD	TXD422	485DATA
3	COM1_TXD_CN	TXD	RXD422	NC
4	COM1_DTR-L_CN	DTR#	RXD422	NC
5	GND	GND	NC	NC
6	COM1_DSR-L_CN	DSR#	NC	NC
7	COM1_RTS-L_CN	RTS#	NC	NC
8	COM1_CTS-L_CN	CTS#	NC	NC
9	COM1_RI-L_CN	RI#	NC	NC
10	NC	NC	NC	NC

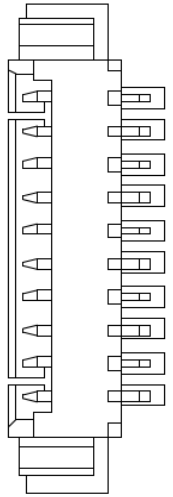
Manufacturer	MAFG P/N	ADLINK P/N
MOLEX	53261-1071	61-6AJ03-1100



6.27. COM Port 2 Wafer

Pin	Signal	RS232	RS422	RS485
1	COM2_DCD-L_CN	DCD#	TXD422	485DATA
2	COM2_RXD_CN	RXD	TXD422	485DATA
3	COM2_TXD_CN	TXD	RXD422	NC
4	COM1_DTR-L_CN	DTR#	RXD422	NC
5	GND	GND	NC	NC
6	COM2_DSR-L_CN	DSR#	NC	NC
7	COM2_RTS-L_CN	RTS#	NC	NC
8	COM2_CTS-L_CN	CTS#	NC	NC
9	COM2_RI-L_CN	RI#	NC	NC
10	NC	NC	NC	NC

Manufacturer	MAFG P/N	ADLINK P/N
MOLEX	53261-1071	61-6AJ03-1100

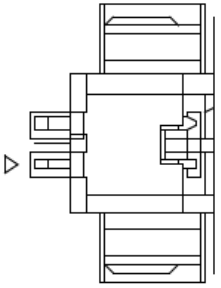


6.28. RTC Battery Wafer

The Real Time Clock battery connector allows connection of a backup battery to sustain the system clock in the event of a power outage.

Pin	Signal
1	P_+VCC_RTC_CN_A
2	GND

Manufacturer	MAFG P/N	ADLINK P/N
JVE	24W1125A-02M00-01T-1-CF01	61-6AJ0X-1020

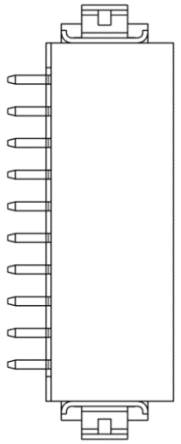


6.29. GPIO Wafer

This device provides 4 channels of non-isolation digital input and 4 channels of non-isolation digital output circuits.

Pin	Signal
1	P_+3V3_S0
2	CN_DI0
3	CN_DI1
4	CN_DI2
5	CN_DI3
6	CN_DO0
7	CN_DO1
8	CN_DO2
9	CN_DO3
10	GND

Manufacturer	MAFG P/N	ADLINK P/N
HIROSE	DF13-10P-1.25H	61-66J05-1100



6.29.1 4-Channel Digital Input

- VIH: 2 to 5.25V
- VIL: 0 to 0.8V

6.29.2 4-Channel Digital Output

- Output type: open drain N-channel
- MOSFET driver with internal pull-high of 200Ω resistance
- Source/Sink current for all channels: 22mA
- VOH: 2.4 to 5V
- VOL: 0 to 0.55V

GPIO Connector Pin Voltage

Pin	Signal	PCH GPIO	Default Value	Input/Output Voltage Range
1	P_+3V3_S0			
2	CN_DI0	GP_B02	Input	VIH: 2 V VIL: 0.8V
3	CN_DI1	GP_B03	Input	VIH: 2 V VIL: 0.8V
4	CN_DI2	GP_B18	Input	VIH: 2 V VIL: 0.8V
5	CN_DI3	GP_B19	Input	VIH: 2 V VIL: 0.8V
6	CN_DO0	GP_D05	Output	VOH: 2.4V VOL: 0.55V
7	CN_DO1	GP_D06	Output	VOH: 2.4V VOL: 0.55V
8	CN_DO2	GP_D07	Output	VOH: 2.4V VOL: 0.55V
9	CN_DO3	GP_D08	Output	VOH: 2.4V VOL: 0.55V
10	GND			

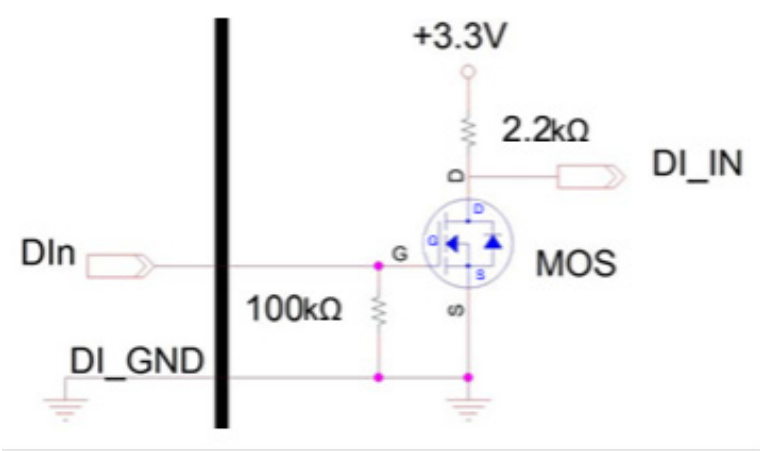


Figure 9 - Digital input circuit

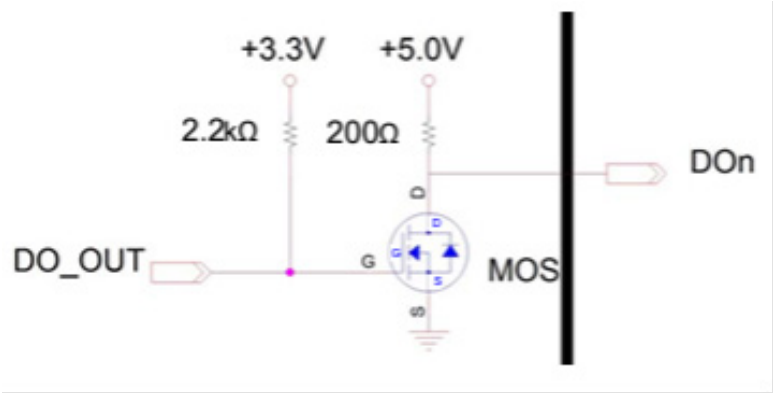
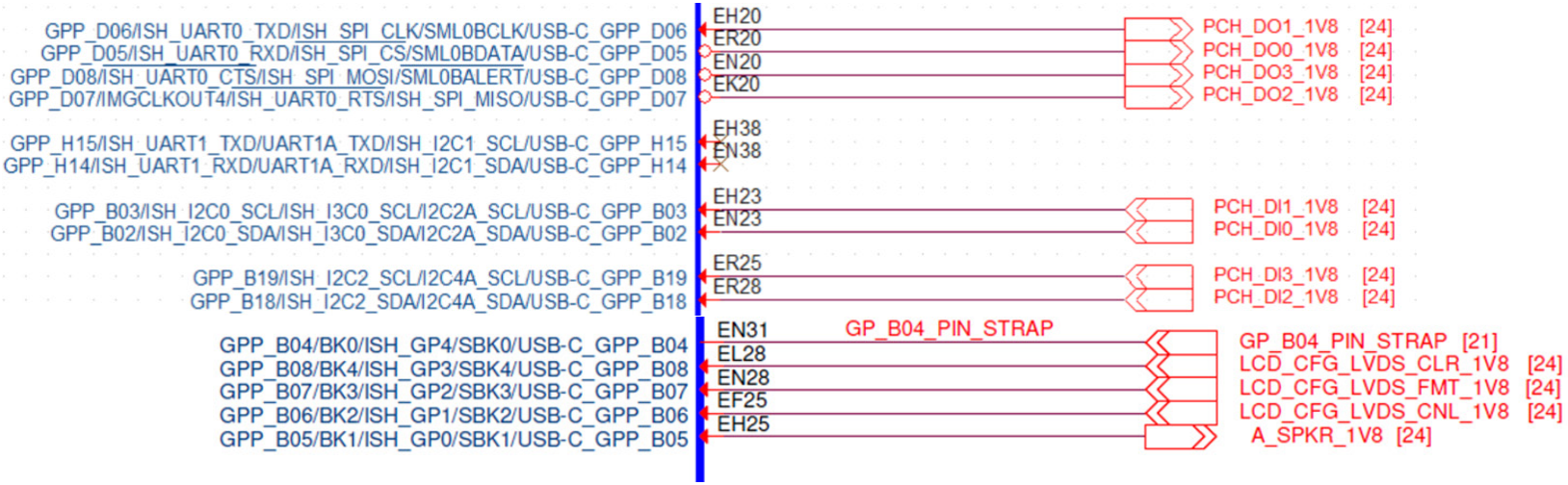


Figure 10 - Digital output circuit

GPIO Address

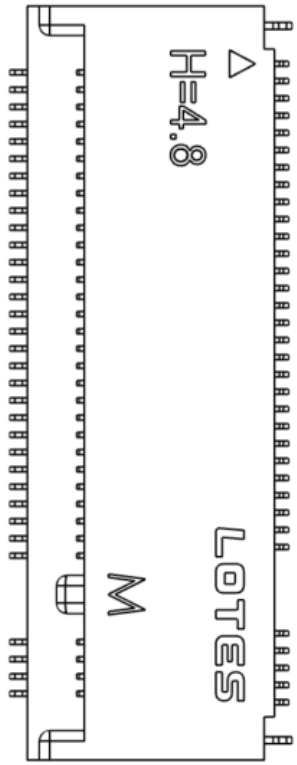
Net name	PCH_GPIO	Address
PCH_DO0_1V8	GPP_D05	0XE0D507E0
PCH_DO1_1V8	GPP_D06	0XE0D507F0
PCH_DO2_1V8	GPP_D07	0XE0D50800
PCH_DO3_1V8	GPP_D08	0XE0D50810
PCH_DI0_1V8	GPP_B02	0XE0D50620
PCH_DI1_1V8	GPP_B03	0XE0D50630
PCH_DI2_1V8	GPP_B18	0XE0D50720
PCH_DI3_1V8	GPP_B19	0XE0D50730



[Bit definition]
Bit 1-Rx state, **1/0** represents **high/low**
Bit -Tx state, set to **1** for output **high**

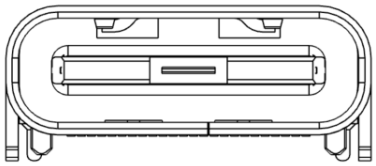
6.30. M.2 2280, M Key for SATA/PCIE X4 NVME Modules

Pin	Signal	Pin	Signal
1	GND	2	P_+3V3_NGFF_M
3	GND	4	P_+3V3_NGFF_M
5	PCIE12_RX_N	6	NC
7	PCIE12_RX_P	8	NC
9	GND	10	NC
11	PCIE12_TX_N	12	P_+3V3_NGFF_M
13	PCIE12_TX_P	14	P_+3V3_NGFF_M
15	GND	16	P_+3V3_NGFF_M
17	PCIE11_RX_N	18	P_+3V3_NGFF_M
19	PCIE11_RX_P	20	NC
21	GND	22	NC
23	PCIE11_TX_N	24	NC
25	PCIE11_TX_P	26	NC
27	GND	28	NC
29	PCIE10_RX_N	30	NC
31	PCIE10_RX_P	32	NC
33	GND	34	NC
35	PCIE10_TX_N	36	NC
37	PCIE10_TX_P	38	PCH_DEVSLP0
39	GND	40	NC
41	M2_PCIE_SATA_RX_P_R	42	NC
43	M2_PCIE_SATA_RX_N_R	44	NC
45	GND	46	NC
47	M2_PCIE_SATA_TX_N_R	48	NC
49	M2_PCIE_SATA_TX_P_R	50	M2M_PLTRST_BUF-L
51	GND	52	PCH_CLK_REQ_P7_N_3V3
53	C_PCIECLK7_100M_N	54	PCH_PCIE_M2M_WAKE-L
55	C_PCIECLK7_100M_P	56	NC
57	GND	58	NC
67	NC	68	NC
69	MUX1_SEL	70	P_+3V3_NGFF_M
71	GND	72	P_+3V3_NGFF_M
73	GND	74	P_+3V3_NGFF_M
75	GND		



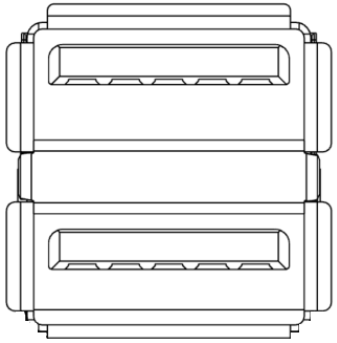
6.31. Thunderbolt Type C Connector

Pin	Signal	Pin	Signal
A1	GND	B1	GND
A2	TBT0_TX0_P	B2	TBT0_TX1_P
A3	TBT0_TX0_N	B3	TBT0_TX1_N
A4	P_+5VBUS_PD0_TBT0	B4	P_+5VBUS_PD0_TBT0
A5	PD0_TBT0_944_CC1_CON	B5	PD0_TBT0_944_CC2_CON
A6	TBT0_USB2_CMC_P	B6	TBT0_USB2_CMC_P
A7	TBT0_USB2_CMC_N	B7	TBT0_USB2_CMC_N
A8	TCP0_SBU1_CON	B8	TCP0_SBU2_CON
A9	P_+5VBUS_PD0_TBT0	B9	P_+5VBUS_PD0_TBT0
A10	TBT0_RX1_N	B10	TBT0_RX0_N
A11	TBT0_RX1_P	B11	TBT0_RX0_P
A12	GND	B12	GND



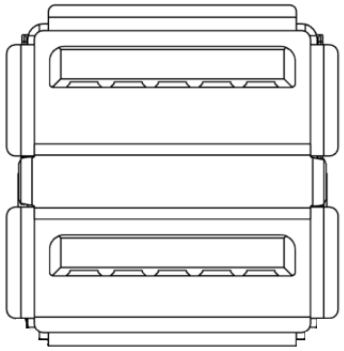
6.32. USB3.2 Gen2 Dual Port 1 Connector

Pin	Signal	Pin	Signal
1	P_+5V0_A_CON_USB3_1	10	P_+5V0_A_CON_USB3_2
2	CON_USB2_D1_N	11	CON_USB2_D2_N
3	CON_USB2_D1_P	12	CON_USB2_D2_P
4	GND	13	GND
5	CON_USB3_RX1_N	14	CON_USB3_RX2_N
6	CON_USB3_RX1_P	15	CON_USB3_RX2_P
7	GND	16	GND
8	CON_USB3_TX1_N	17	CON_USB3_TX2_N
9	CON_USB3_TX1_P	18	CON_USB3_TX2_P



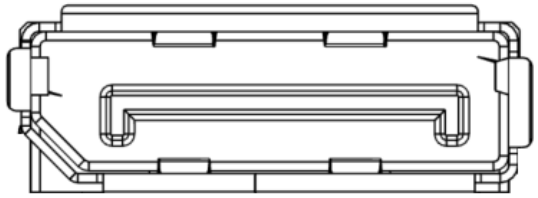
6.33. USB3.2 Gen2 Dual Port 2 Connector

Pin	Signal	Pin	Signal
1	P_+5V0_A_CON_USB3_3	10	P_+5V0_A_CON_USB3_4
2	CON_USB2_D3_N	11	CON_USB2_D4_N
3	CON_USB2_D3_P	12	CON_USB2_D4_P
4	GND	13	GND
5	CON_USB3_RX3_N	14	CON_USB3_RX4_N
6	CON_USB3_RX3_P	15	CON_USB3_RX4_P
7	GND	16	GND
8	CON_USB3_TX3_N	17	CON_USB3_TX4_N
9	CON_USB3_TX3_P	18	CON_USB3_TX4_P



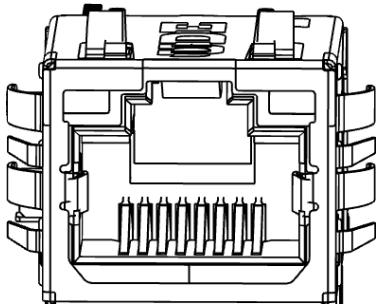
6.34. DP Connector

Pin	Signal
1	DP+TCP2_TX0_P
2	GND
3	DP_TCP2_TX0_N
4	DP_TCP2_TX1_P
5	GND
6	DP_TCP2_TX1_N
7	DP_TCP2_TX2_P
8	GND
9	DP_TCP2_TX2_N
10	DP_TCP2_TX3_P
11	GND
12	DP_TCP2_TX3_N
13	CON_TCP2_DDC_AUX_SEL
14	CON_TCP2_CONFIG_2
15	CON_TCP2_I2CCLK_AUX_P
16	GND
17	CON_TCP2_I2CDAT_AUX_N
18	CON_TCP2_HPD
19	GND
20	P_+3v3_DP1



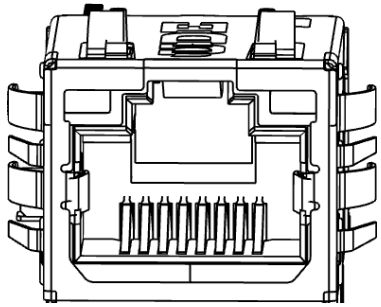
6.35. LAN1 RJ45 Connector

Pin	Signal
R1	L_GBE1_MDI0_P
R2	L_GBE1_MDI0_N
R3	L_GBE1_MDI1_P
R4	L_GBE1_MDI1_N
R5	Cap to GND
R6	Cap to GND
R7	L_GBE1_MDI2_P
R8	L_GBE1_MDI2_N
R9	L_GBE1_MDI3_P
R10	L_GBE1_MDI3_N
L1	LINK_ACT_LED
L2	L_GBE1_LED1_LINK/ACT-L
L3	L_GBE1_LINK1000-L
L4	L_GBE1_LINK2500-L



6.36. LAN2 RJ45 Connector

Pin	Signal
R1	L_GBE2_MDI0_P_RJ45
R2	L_GBE2_MDI0_N_RJ45
R3	L_GBE2_MDI1_P_RJ45
R4	L_GBE2_MDI1_N_RJ45
R5	Cap to GND
R6	Cap to GND
R7	L_GBE2_MDI2_P_RJ45
R8	L_GBE2_MDI2_N_RJ45
R9	L_GBE2_MDI3_P_RJ45
R10	L_GBE2_MDI3_N_RJ45
L1	LINK_ACT_LED2
L2	LGBE2_LED1_LINK/ACT-L
L3	L_GBE2_LINK1000-L
L4	L_GBE2_LINK2500-L



6.37. LAN (I226) LED Connector Position

LED Color	Status	Description
Yellow (Left LED)	OFF	Ethernet port is disconnected.
	ON	Ethernet port is connected with no activity.
	Flashing	Ethernet port is connected and active.

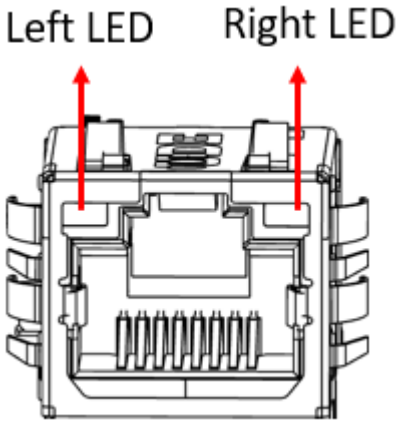
6.37.1 LAN1/2 Active/Link LED

LAN1/2 Speed LED (2.5G)

LED Color	Status	Description
Yellow (Left LED)	OFF	10/100 Mbps
	Yellow	1000 Mbps
	Yellow	2500 Mbps

LAN1/2 Speed LED (1G)

LED Color	Status	Description
Yellow (Left LED)	OFF	10 Mbps
	OFF	100 Mbps
	Yellow	1000 Mbps



6.38. Jumper Setting

Backlight PWR

Backlight PWR option

JP1 Backlight PWR	
1-2	+12V (Default)
2-3	+5V

Clear CMOS header

Under conditions where the device fails to boot, clearing the BIOS content stored in CMOS and restoring the default settings may be effective. To clear CMOS, short Pin 2 and Pin 3, then wait for 5 seconds. Remove the jumper cap and short Pin 1 and Pin 2.

Clear COS Pin Header	
CN1	
(1-2)	NA (Default)
(2-3)	Clear CMOS

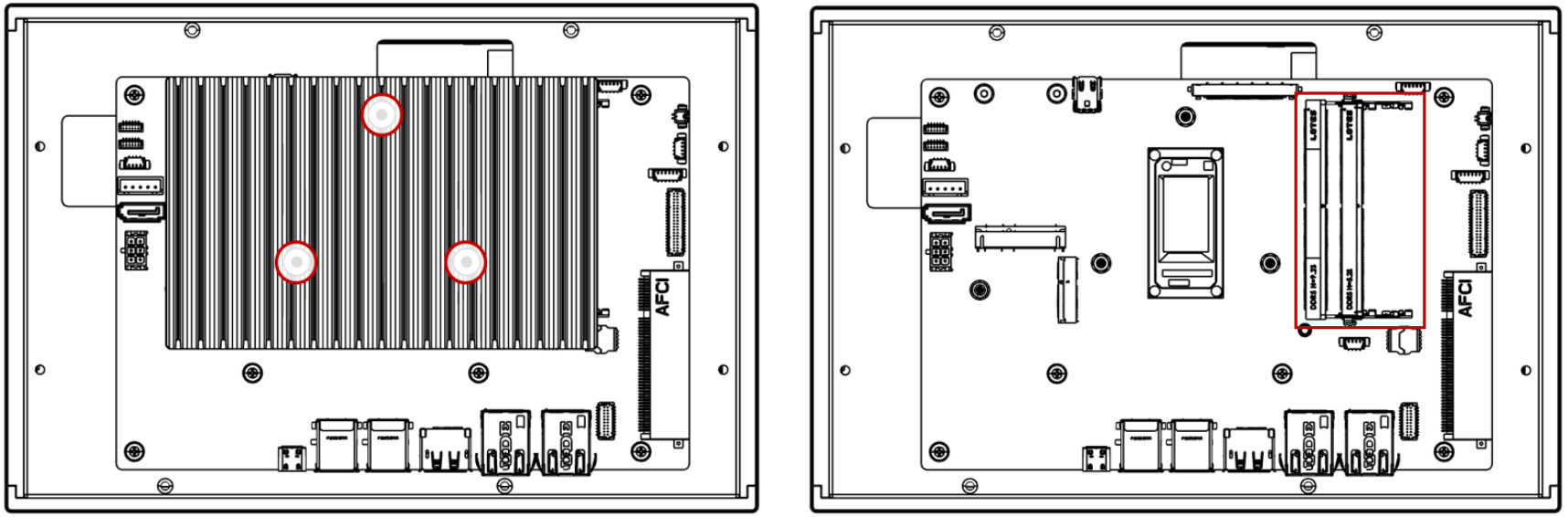
7. Getting Started

Follow the instructions in this chapter to add or change memory; Wi-Fi modules, mounting brackets, and mounting clips.

7.1. Adding or Changing Memory

Follow these steps to add or change memory modules.

1. Remove the 3 screws that attach the heatsink to the mainboard, and then remove the heatsink.
2. Install or swap the memory module in the SODIMM socket as necessary.

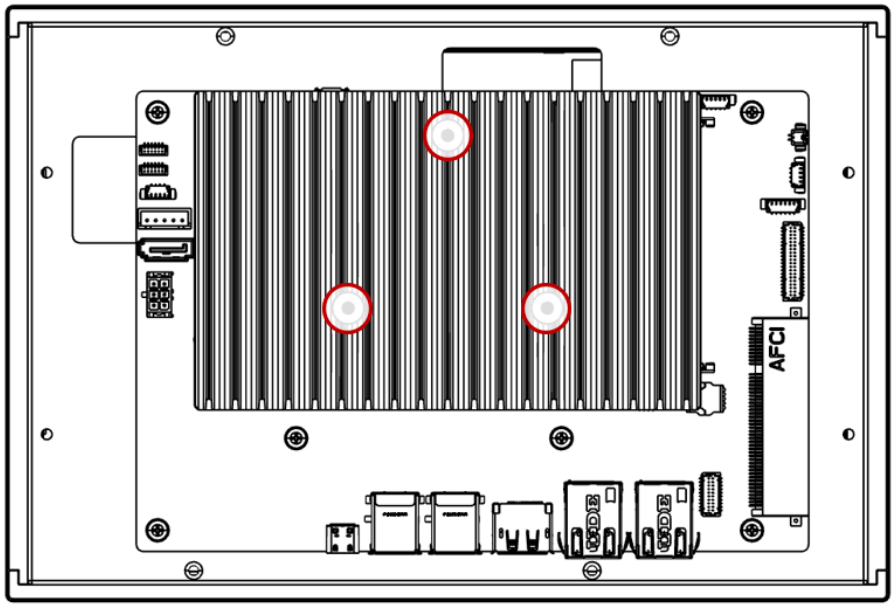


3. Reattach the heat sink to the mainboard with the previously removed screws.

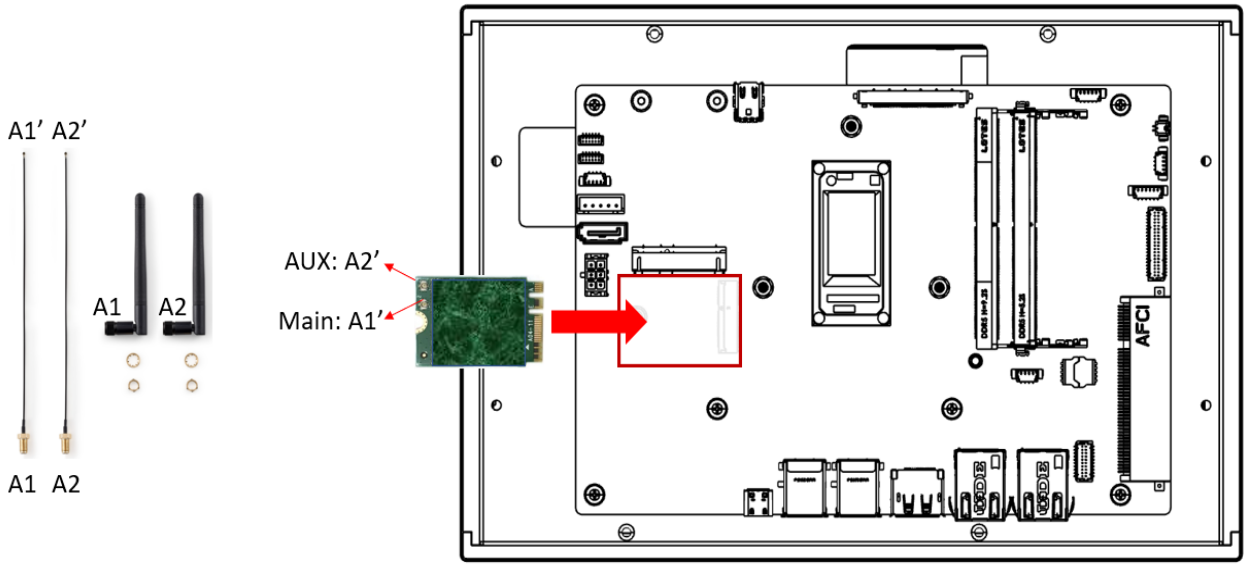
7.2. Installing a Wi-Fi-Module

Follow these steps to add or change a Wi-Fi module.

1. Remove the 3 screws that attach the heatsink to the mainboard, and then remove the heatsink.

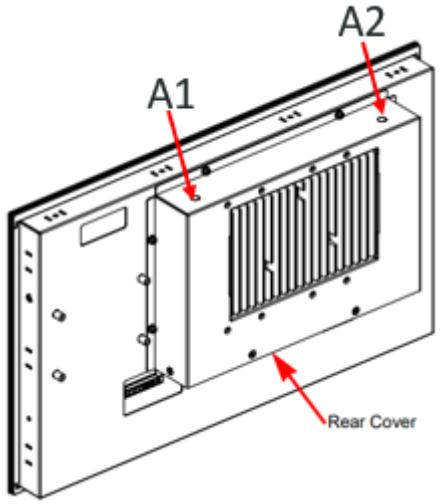


2. Install the Wi-Fi module.



3. Reattach the heat sink to the mainboard with the previously removed screws.

4. Install Antennas to rear cover or equipment

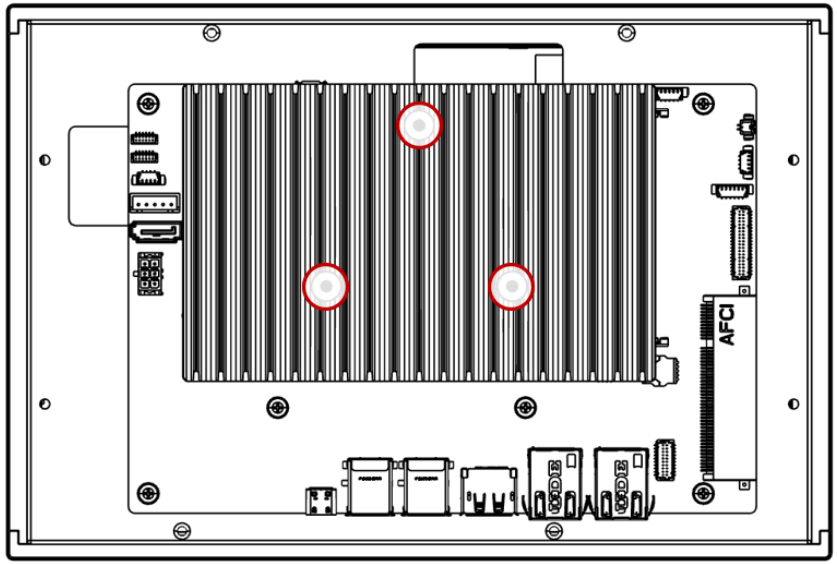


Note: Wi-Fi antennas must be installed on the SP2-MTL Series housing in order for Wi-Fi to function properly.

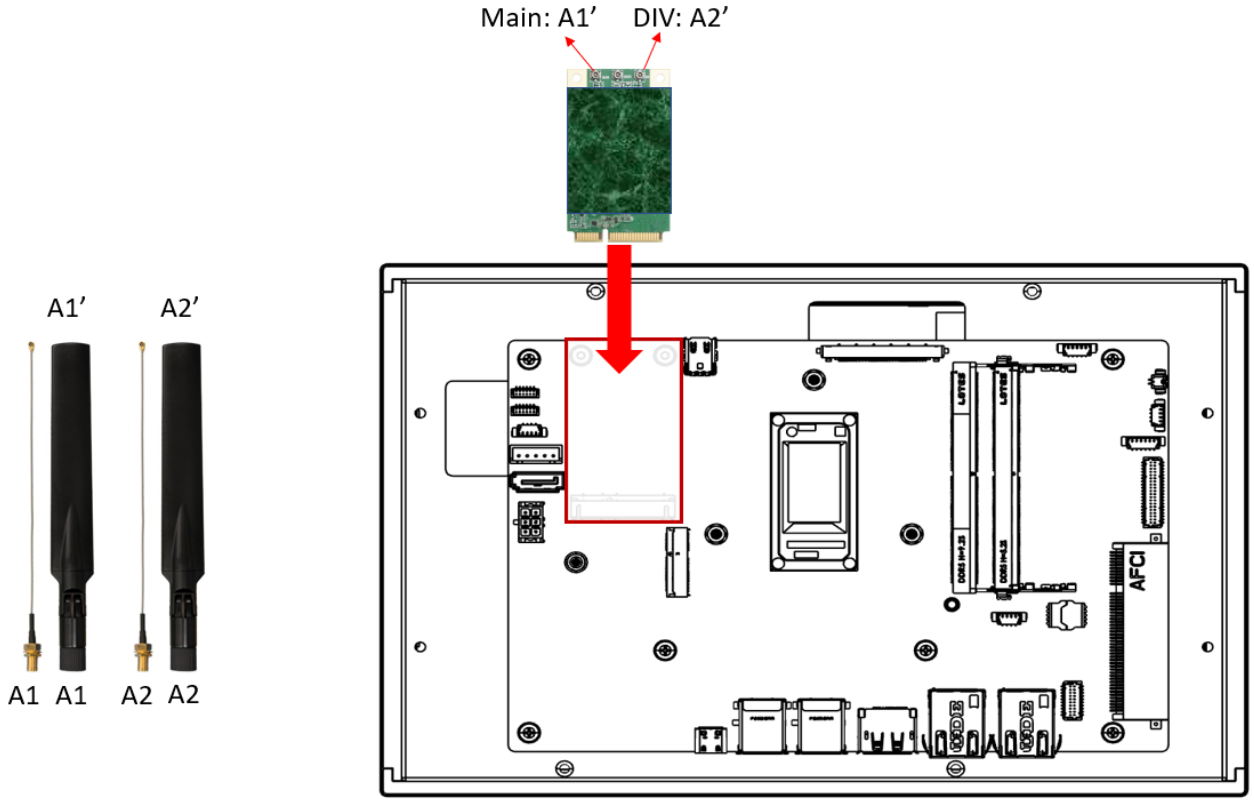
7.3. Installing an LTE Module

Follow these steps to add or change a Wi-Fi module.

1. Remove the 3 screws that attach the heatsink to the mainboard, and then remove the heatsink.

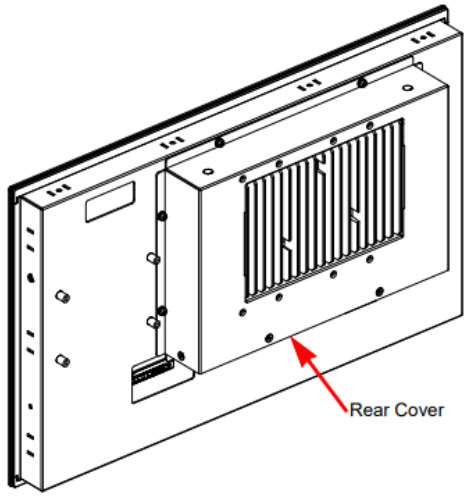


2. Install the LTE module.



3. Reattach the heat sink to the mainboard with the previously removed screws.

4. Install Antennas to rear cover or equipment



Note: LTE antennas must be installed on the SP2-MTL Series housing in order for LTE to function properly.

7.4. Mounting

This section includes details for panel and VESA mounting options.

Note: All dimensions are in millimeters, unless noted.

Warning: Risk of physical injuries and / or property damage:
When mounting the device, use the screws to mount the VESA bracket to the rear of the device. Tighten all four screws firmly to support the weight of the device. Make sure that the suspension system is capable of carrying the device.

Caution: Risk of burns to the user caused by hot surfaces:
Turn off power and allow the device to cool down prior to performing any mounting or demounting operations. Do not touch the enclosure for over 10 seconds when the device is in operations or is still hot from previous use.

7.4.1 Panel Mounting

The SP2-MTL Series can be panel mounted with 14 mounting clips (optional items sold separately). Make sure there is adequate space behind the panel for ventilation, and that the panel material and thickness can support the weight of the device.

Step 1: Cut the panel opening using the appropriate cutout dimensions.

SP2-10WP cutout

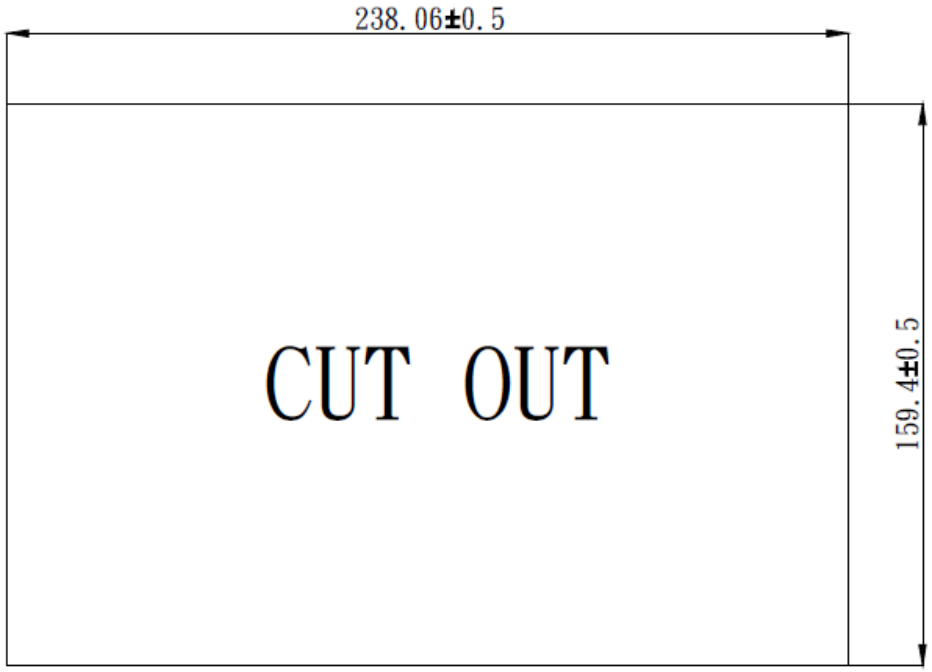


Figure 11 - SP2-10WP cutout dimensions

SP2-15WP cutout

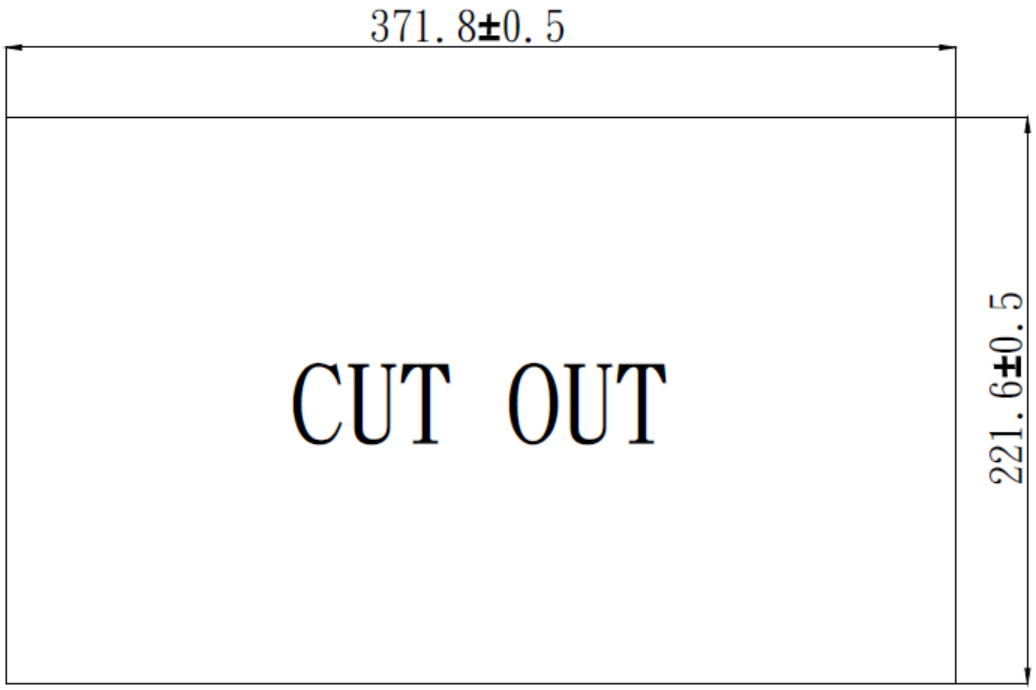


Figure 12 - SP2-15WP cutout dimensions

SP2-21WP cutout

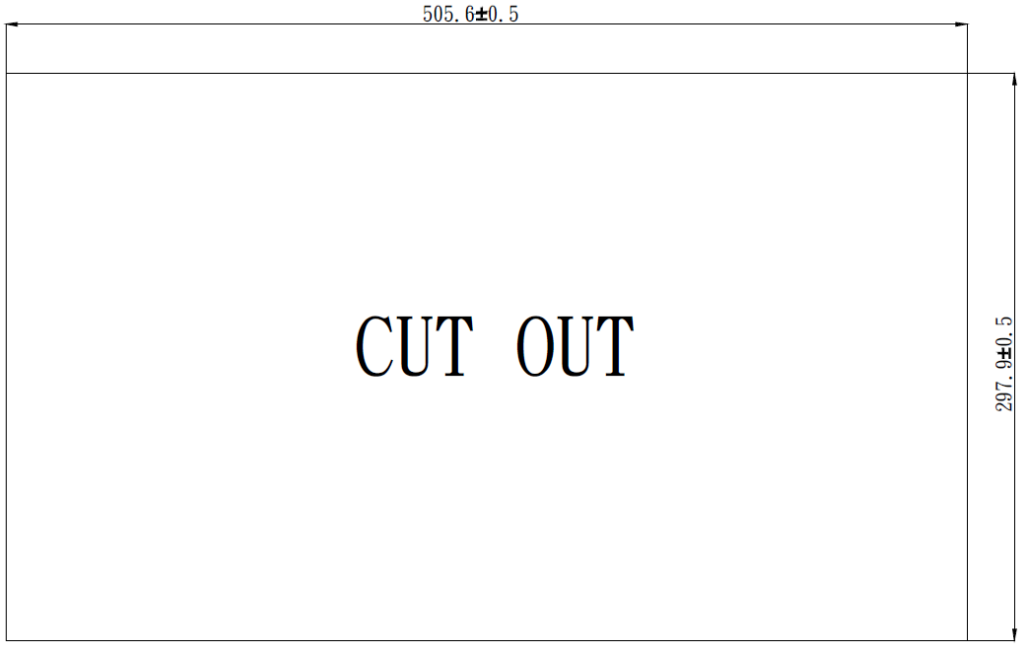
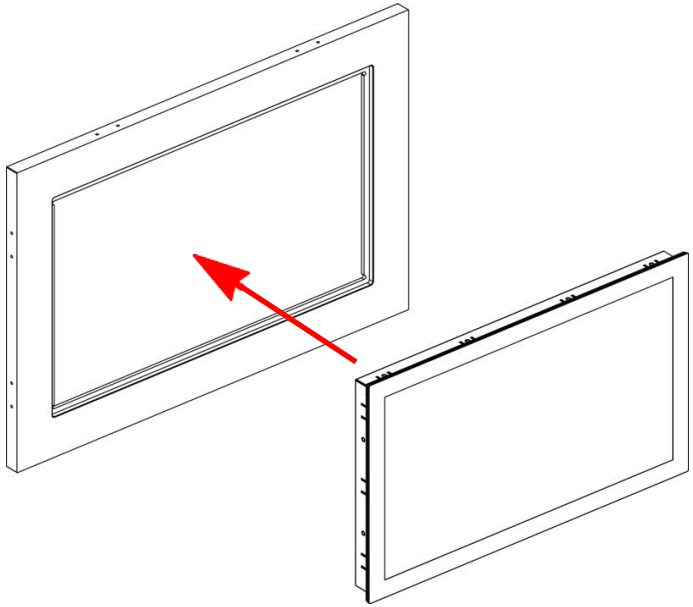


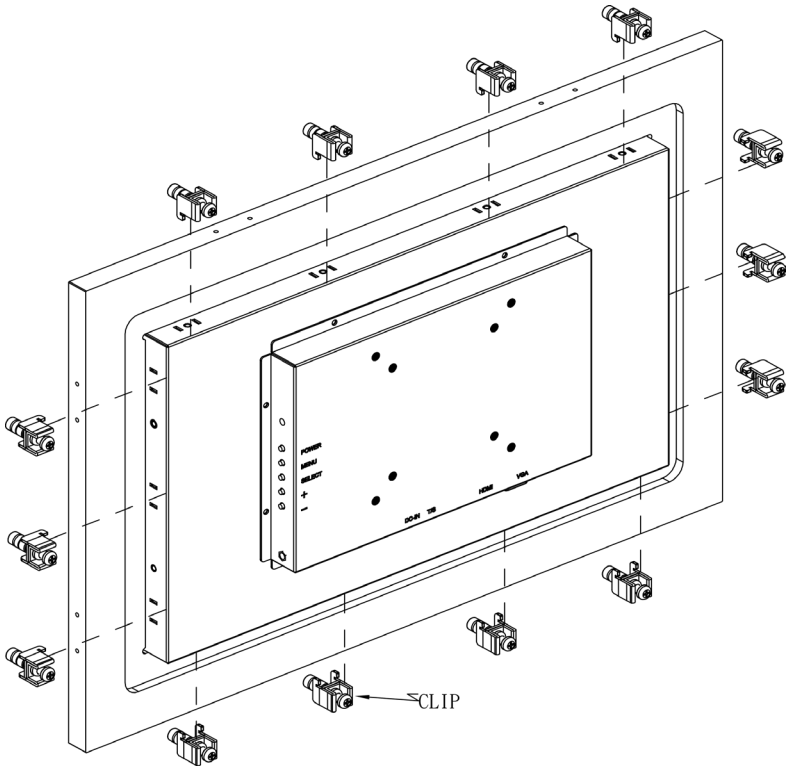
Figure 13 - SP2-21WP cutout dimensions

Step 2: Attach I/O cables to the device before installing into the panel if rear access will be limited after installation.

Step 3: Place the device into the panel cutout.



Step 4: Insert the mounting clips into the slots on the sides of the device as shown. Hand-tighten the mounting clips with a Phillips- head screwdriver to secure it to the panel. Do not overtighten the clips to avoid damaging the device enclosure.



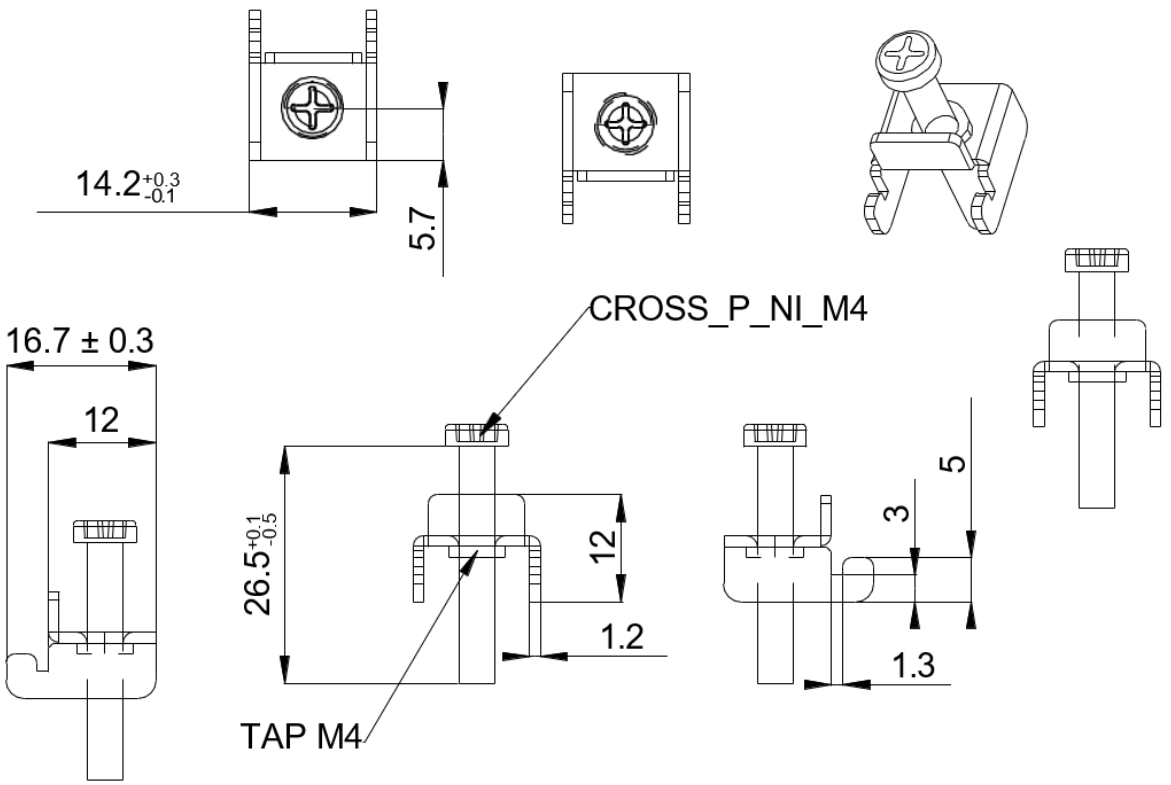


Figure 14 - Mounting clip dimensions

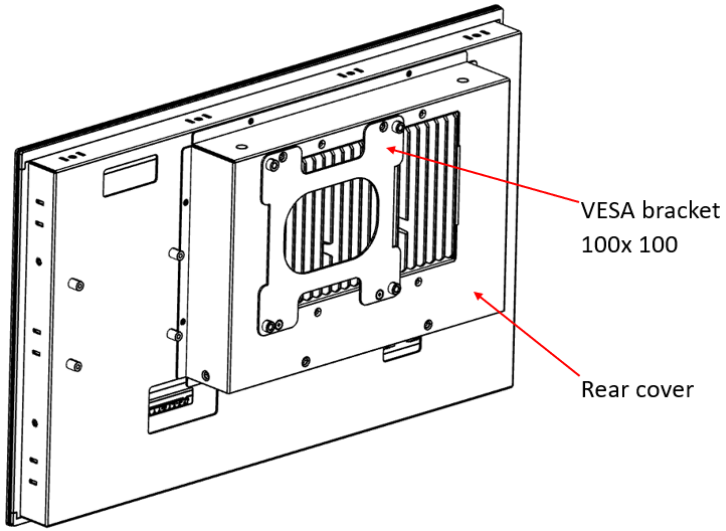
Note: Optional mounting clips sold separately. Contact your ADLINK reseller for details.

7.4.2 VESA Mounting

The SP2-MTL Series can be VESA mounted with a rear cover and VESA bracket. (Optional items sold separately.)

Note: 1. All I/O ports must face down. 2. Optional VESA bracket and M3 screws sold separately. Contact your ADLINK reseller for details. 3. Mounting bracket provides 100 mm x 100 mm VESA mounting and requires 4x M4 screws.

Attach the rear cover to the panel PC with the screws supplied in the kit, then secure the VESA bracket to the rear cover with 4x M3 screws.



8. Driver and Application Installation

After installing the operating system, all related drivers must be installed for the system to function properly. This section describes the drivers needed for Windows operating systems and the procedures to install them. For other operating system support, contact ADLINK for further information.

Visit the ADLINK web site to download drivers:

https://www.adlinktech.com/Products/Panel_PCs_Monitors/Panel_PCs_Monitors/SP2-MTL_Series

9. BIOS Setup

9.1. Menu Structure

This section presents the six primary menus of the BIOS Setup Utility. Use the following table as a quick reference for the contents of the BIOS Setup Utility. The subsections in this section describe the submenus and setting options for each menu item. The default setting options are presented in **bold**, and the function of each setting is described in the right-hand column of the respective table.

Main	Advanced	Chipset	Security	Boot	Save & Exit
BIOS Information System Information System Date System Time	CPU Configuration► Power Management► Graphics Configuration► Super I/O Configuration► BIOS Watchdog Timer► Serial Port Console Redirection► Hardware Monitor► NVME Configuration► Trusted Computing► Miscellaneous► Network Stack Configuration►	System Agent (SA) Configuration► PCH-IO Configuration►	Password Description Secure Boot Menu►	Boot Configuration	Save Options Default Options Boot Override

Notes:

► Indicates a submenu
Gray text indicates info only

9.2. Main

The Main Menu provides read-only information about your system and allows you to set the System Date and Time. Refer to the tables below for details about the submenus and settings.

9.2.1 BIOS Information

Feature	Options	Description
BIOS Vender	Info only	American Megatrends
BIOS Version	Info only	Display Core version
Build Date	Info only	Display Compliancy Information
MRC Version	Info only	Display compliancy Information
GOP Driver Version	Info only	Display Intel Graphic Version
ME FW Version	Info only	Display Intel CSME Version

9.2.2 System Information

Board Information	Info only	Description
Project Name	Info only	Display Project Name
CPU Board Version	Info only	Display CPU Signature
CPU Brand String	Info only	Display CPU Brand Name
Total Memory	Info only	Display installed Memory Size
Memory Frequency	Info only	Display memory Frequency
PCH SKU	Info only	Display PCH Information
FM Board	Info only	

9.2.3 Board Information

Board Information	Info only	Description
Serial Number	Read only	Display SMC Serial Number
Manufacturing Date	Read only	Display SMC Manufacturing Date.
Last Repair Date	Read only	Display SMC Last Repair Date.

9.2.4 System Date and Time

Feature	Options	Description
System Date	Weekday, MM/DD/YYYY	Requires the alpha-numeric entry of the day of the week, day of the month, calendar month, and all 4 digits of the year, indicating the century and year (Fri XX/XX/20XX)
System Time	HH/MM/SS	Presented as a 24-hour clock setting in hours, minutes, and seconds
Access Level	Info only	

9.3. Advanced

This menu contains the settings for most of the user interfaces in the system.

9.3.1 CPU Configuration

Feature	Options	Description
Turbo Mode	Disabled, **Enabled**	Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.
C States	Disabled, **Enabled**	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Intel Trusted Execution Technology	**Disabled**, Enabled	Enables utilization of additional hardware capabilities provided by Intel (R) Trusted Execution Technology. Changes require a full power cycle to take effect.
X2APIC Enable	Disabled, **Enabled**	Enable/Disable X2APIC Operating Mode.

9.3.2 Power Management

9.3.2.1. Power Management

Feature	Options	Description
Enable ACPI Auto Configuration	**Disabled**, Enabled	Enables or Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled, **Enabled**	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.
ACPI Sleep State	Suspend Disabled, **S3 (Suspend to RAM)**	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

Feature	Options	Description
ERP	**Disabled**, Enabled	Energy-Related Products
State After G3	**S0 State**, S5 State	Specify what state to go to when power is re-applied after a power failure (G3 state).

9.3.3 Graphic Configuration

Feature	Options	Description
Nxp configuration	Info Only	
Data format and Color Depth	**Auto** VESA 24 bpp JEIDA 24 bpp JEIDA/vesa 18 bpp	Data format and Color Depth select
LVDS Output Mode	**Auto** Dual LVDS bus Single LVDS bus	Single/Dual mode select
DE Polarity	**Active High** Active Low	DE Polarity select
Vsync Polarity	**Active High** Active Low	Vsync Polaity select
Spreading depth	No Spreading 0.5% 1.0% 1.5% 2.0% **2.5%**	Clock frequency center spreading depth.
Integrated Display Configuration	Info only	

eDP/LVDS	Disabled **Enabled**	Enable/Disable eDP/LVDS
LFP Panel Type	VBIOS Default 640x480 800x600 1024x768 1280x1024 1400x1050 LVDS1 1400x1050 LVDS2 1600x1200 1366x768 1680x1050 1920x1200 1440x900 1600x900 1024x768 **1280x800** 1920x1080 2048x1536	Select LFP panel used by Internal Graphics Device by selecting the appropriate setup item.
DDI port 1	No Device, Display Port, HDMI, **DisplayPort with HDMI/DVI Compatible**	Select LVDS Backlight control function.

9.3.4 Super I/O Configuration

Feature	Options	Description
Super IO Configuration	Info only	
NCT5525D Super IO Configuration	submenu	
NCT5104S Super IO Configuration	submenu	

9.3.4.1. Super I/O Configuration > NCT5525D Super I/O Configuration

Feature	Options	Description
NCT5525D Super IO Configuration	Info only	
Super IO Chip	Info only	
Serial Port 1 Configuration	submenu	
Serial Port 2 Configuration	submenu	

9.3.4.1.1. Super I/O Configuration > NCT5525D Super I/O Configuration > Serial Port 1 Configuration

Feature	Options	Description
Serial Port 1 Configuration	Info only	
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM).
Device Settings	Info only	
Device Mode	**RS232** RS485 RS422	Change the Serial Port mode

9.3.4.1.2. Super I/O Configuration > NCT5525D Super I/O Configuration > Serial Port 2 Configuration

Feature	Options	Description
Serial Port 1 Configuration	Info only	
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM).
Device Settings	Info only	
Device Mode	**RS232** RS485 RS422	Change the Serial Port mode

9.3.4.2. Super I/O Configuration > NCT5104D Super I/O Configuration

Feature	Options	Description
NCT5104D Super IO Configuration	Info only	
Super IO Chip	Info only	
Serial Port 1 Configuration	submenu	
Serial Port 2 Configuration	submenu	

9.3.4.2.1. Super I/O Configuration > NCT5104D Super I/O Configuration > Serial Port 1 Configuration

Feature	Options	Description
Serial Port 1 Configuration	Info only	
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM).
Device Settings	Info only	
COM1 Control	**RS232**	Select COM1 mode, RS232, RS422 or RS485

Feature	Options	Description
	RS485 RS422	

9.3.4.2.2. Super I/O Configuration > NCT5104D Super I/O Configuration > Serial Port 2 Configuration

Feature	Options	Description
Serial Port 2 Configuration	Info only	
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM).
Device Settings	Info only	
COM2 Control	**RS232** RS485 RS422	Select COM2 mode, RS232, RS422 or RS485

9.3.4.2.3. Super I/O Configuration > NCT5104D Super I/O Configuration > Serial Port 3 Configuration

Feature	Options	Description
Serial Port 3 Configuration	Info only	
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM).
Device Settings	Info only	

9.3.4.2.4. Super I/O Configuration > NCT5104D Super I/O Configuration > Serial Port 4 Configuration

Feature	Options	Description
Serial Port 4 Configuration	Info only	
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM).
Device Settings	Info only	

9.3.5 BIOS Watchdog Timer

Feature	Options	Description
BIOS Watchdog Timer	**Info only**	
BIOS POST watchdog	**Disabled,** Second Mode, Minute Mode	1. Disable: Disables Watchdog Timer; 2. Second Mode: Enables Watchdog Timer in second mode; 3. Minute Mode: Enables Watchdog Timer in minute mode.

9.3.6 Serial Console Redirection

Feature	Options	Description
Console Redirection	**Disabled,** Enabled	To enable or disable console redirection of COMx.
Console Redirection Settings	Submenu	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

9.3.6.1. Serial Port Console > Console Redirection Settings

Feature	Options	Description
COM0	Info only	
Console Redirection Settings	Info only	
Terminal Type	VT100 VT100+ VT-UTF8 **ANSI**	Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 **115200**	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Data Bits	7 **8**	Data Bits.
Parity	**None** Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection.
Stop Bits	**1** 2	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

9.3.7 Hardware Monitor

Feature	Options	Description
System temperature	Info Only	
CPU temperature	Info Only	
MXM FAN Speed	Info Only	
SYSTEM FAN Speed	Info Only	
5V_S0	Info Only	
VCCCORE	Info Only	
VCC3V	Info Only	
VSB3V	Info Only	
VBAT	Info Only	
AVSB	Info Only	
Smart Fan Function	Submenu	Smart Fan function setting

9.3.7.1. Hardware Monitor > Smart Fan Function

Feature	Options	Description
MXM Fan Setting	Submenu	
System Fan Setting	Submenu	

9.3.7.1.1. Hardware Monitor > Smart Fan Function > MXM / System Fan setting

Feature	Options	Description
Fan Mode	Manual mode, SMART FAN IV	Fan control mode select
Manual PWM	128	Fan will operate based on the manual PWM value (0 to 255 corresponds to 0% to 100%)

9.3.8 NVMe Configuration

Feature	Options	Description
Seg:Bus:Dev:Func	Info only	
Model Number	Info only	
Total Size	Info only	
Vendor ID	Info only	
Device ID	Info only	
Namespace	Info only	
Self Test Option	**Short** Extended	Select either Short or Extended Self Test. Short option will take couple of minutes and extended option will take several minutes to complete.
Self Test Action	**Controller Only Test** Controller and NameSpace Test	Select either to test controller alone or Controller and NameSpace. Selecting Controller and Namespace option will take lot longer to complete the test.
Run Device Self Test		Perform device self test for the corresponding Option and Action selected by user. Pressing 'Esc' key will abort the test. Result shown below is the recent result logged in the device.

9.3.9 Trusted Computing

Feature	Options	Description
Security Device Support	**Disable**, Enable	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

9.3.10 Miscellaneous

Feature	Options	Description
Miscellaneous	Info only	
BIOS Lock	**Disabled** Enabled	Enables/Disables the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.

9.3.11 Network Stack Configuration

Feature	Options	Description
Network Stack	**Disabled** Enabled	Enables/Disables UEFI network stack.
Ipv4 PXE Support	**Disabled** Enabled	Enables/Disables IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
Ipv6 PXE Support	**Disabled** Enabled	Enables/Disables IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
PXE boot wait time	**0**	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

9.4. Chipset

Feature	Options	Description
System Agent (SA) Configuration	submenu	
PCH-IO Configuration	submenu	

9.4.1 System Agent (SA) Configuration

Feature	Options	Description
Graphics Configuration	submenu	Graphics Configuration
VT-d setup menu	submenu	VT-d Configuration settings
Above 4GB MMIO BIOS assignment	**Enabled,** Disabled	Enables/Disables above 4GB MemoryMappedIO BIOS assignment\n\nThis is enabled automatically when Aperture Size is set to 2048MB.

9.4.1.1. System Agent (SA) Configuration > Graphics Configuration

Feature	Options	Description
Primary Display	Auto, **IGFX**, HG	Select AUTO set IGD to be Primary Display if no external Graphics Device connected otherwise external Graphics Device detected on first PCIe port will be Primary Display or Select IGFX
Internal Graphics	Disabled, **Enabled**	Keep IGFX enabled based on the setup options.

9.4.2 PCH-I/O Configuration

Feature	Options	Description
PCI Express Configuration	Submenu	
SATA Configuration	Submenu	

USB Configuration	Submenu	
HD Audio Configuration	Submenu	

9.4.2.1. PCH-I/O Configuration > PCI Express Configuration

Feature	Options	Description
PCI Express Root Port PXPA3	Submenu	Control the PCI Express Root Port.
PCI Express Root Port PXPA4	Submenu	Control the PCI Express Root Port.
PCI Express Root Port PXPB1	Submenu	Control the PCI Express Root Port.
PCI Express Root Port PXPB2	Submenu	Control the PCI Express Root Port.
PCI Express Root Port PXPB3	Submenu	Control the PCI Express Root Port.
PCI Express Root Port PXPB4	Submenu	Control the PCI Express Root Port.

9.4.2.1.1. PCH-I/O Configuration > PCI Express Configuration > PCI Express Root Port PXPA3

Feature	Options	Description
PCI Express Root Port PXPA3	Disabled, **Enabled**	Control the PCI Express Root Port.
Connection Type	Built-in, **Slot**	Built-In: a built-in device is connected to this rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented bit will be set.
ASPM	**Disabled**, L0s, L1, L0sL1, Auto	Set the ASPM Level:Force L0s - Force all links to L0s StateAUTO - BIOS auto configureDISABLE - Disables ASPM
L1 Substates	Disabled, L1.1, **L1.1 & L1.2**	PCI Express L1 Substates settings.
Hot Plug	**Disabled**, Enabled	PCI Express Hot Plug Enable/Disable.

PCIe Speed	**Auto**, Gen1, Gen2, Gen3, Gen4	Configure PCIe Speed

9.4.2.1.2. PCH-I/O Configuration > PCI Express Configuration > PCI Express Root Port PXPA4

Feature	Options	Description
PCI Express Root Port PXPA4	Disabled, **Enabled**	Control the PCI Express Root Port.
Connection Type	Built-in, **Slot**	Built-In: a built-in device is connected to this rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented bit will be set.
ASPM	**Disabled**, L0s, L1, L0sL1, Auto	Set the ASPM Level:Force L0s - Force all links to L0s StateAUTO - BIOS auto configureDISABLE - Disables ASPM
L1 Substates	Disabled, L1.1, **L1.1 & L1.2**	PCI Express L1 Substates settings.
Hot Plug	**Disabled**, Enabled	PCI Express Hot Plug Enable/Disable.
PCIe Speed	**Auto**, Gen1, Gen2, Gen3, Gen4	Configure PCIe Speed

9.4.2.1.3. PCH-I/O Configuration > PCI Express Configuration > PCI Express Root Port PXPB1

Feature	Options	Description
PCI Express Root Port PXPB1	Disabled, **Enabled**	Control the PCI Express Root Port.
Connection Type	Built-in, **Slot**	Built-In: a built-in device is connected to this rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented bit will be set.
ASPM	**Disabled**, L0s, L1, L0sL1, Auto	Set the ASPM Level:Force L0s - Force all links to L0s StateAUTO - BIOS auto configureDISABLE - Disables ASPM
L1 Substates	Disabled, L1.1, **L1.1 & L1.2**	PCI Express L1 Substates settings.
Hot Plug	**Disabled**, Enabled	PCI Express Hot Plug Enable/Disable.
PCIe Speed	**Auto**, Gen1, Gen2, Gen3, Gen4	Configure PCIe Speed

9.4.2.1.4. PCH-I/O Configuration > PCI Express Configuration > PCI Express Root Port PXPB2

Feature	Options	Description
PCI Express Root Port PXB2	Disabled, **Enabled**	Control the PCI Express Root Port.
Connection Type	Built-in, **Slot**	Built-In: a built-in device is connected to this rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented bit will be set.
ASPM	**Disabled**, L0s, L1,	Set the ASPM Level:Force L0s - Force all links to L0s StateAUTO - BIOS auto configureDISABLE - Disables ASPM

	L0sL1, Auto	
L1 Substates	Disabled, L1.1, **L1.1 & L1.2**	PCI Express L1 Substates settings.
Hot Plug	**Disabled**, Enabled	PCI Express Hot Plug Enable/Disable.
PCIe Speed	**Auto**, Gen1, Gen2, Gen3, Gen4	Configure PCIe Speed

9.4.2.1.5. PCH-I/O Configuration > PCI Express Configuration > PCI Express Root Port PXPB3

Feature	Options	Description
PCI Express Root Port PXB3	Disabled, **Enabled**	Control the PCI Express Root Port.
Connection Type	Built-in, **Slot**	Built-In: a built-in device is connected to this rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented bit will be set.
ASPM	**Disabled**, L0s, L1, L0sL1, Auto	Set the ASPM Level:Force L0s - Force all links to L0s StateAUTO - BIOS auto configureDISABLE - Disables ASPM
L1 Substates	Disabled, L1.1, **L1.1 & L1.2**	PCI Express L1 Substates settings.
Hot Plug	**Disabled**, Enabled	PCI Express Hot Plug Enable/Disable.
PCIe Speed	**Auto**, Gen1, Gen2,	Configure PCIe Speed

	Gen3, Gen4	

9.4.2.1.6. PCH-I/O Configuration > PCI Express Configuration > PCI Express Root Port PXPB4

Feature	Options	Description
PCI Express Root Port PXPB4	Disabled, **Enabled**	Control the PCI Express Root Port.
Connection Type	**Built-in**, Slot	Built-In: a built-in device is connected to this rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented bit will be set.
ASPM	**Disabled**, L0s, L1, L0sL1, Auto	Set the ASPM Level:Force L0s - Force all links to L0s StateAUTO - BIOS auto configureDISABLE - Disables ASPM
L1 Substates	Disabled, L1.1, **L1.1 & L1.2**	PCI Express L1 Substates settings.
Hot Plug	**Disabled**, Enabled	PCI Express Hot Plug Enable/Disable.
PCIe Speed	**Auto**, Gen1, Gen2, Gen3, Gen4	Configure PCIe Speed

9.4.2.2. PCHI-I/O Configuration > SATA Configuration

Feature	Options	Description
Port 0	Disabled, **Enabled**	Enable or Disable SATA Port
Hot Plug	**Disabled**, Enabled	Designates this port as Hot Pluggable.

9.4.2.3. PCHI-I/O Configuration > USB Configuration

Feature	Options	Description
USB Port Disable Override	**Disabled**, Enabled	Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller.
USB SW Device Mode Port #0	**Disabled**, Enabled	Enable Connector Event for device subscription.
USB SW Device Mode Port #1	**Disabled**, Enabled	Enable Connector Event for device subscription.
USB SW Device Mode Port #2	**Disabled**, Enabled	Enable Connector Event for device subscription.
USB SW Device Mode Port #3	**Disabled**, Enabled	Enable Connector Event for device subscription.
USB SW Device Mode Port #4	**Disabled**, Enabled	Enable Connector Event for device subscription.
USB SW Device Mode Port #5	**Disabled**, Enabled	Enable Connector Event for device subscription.
USB SW Device Mode Port #6	**Disabled**, Enabled	Enable Connector Event for device subscription.
USB SW Device Mode Port #7	**Disabled**, Enabled	Enable Connector Event for device subscription.
USB SW Device Mode Port #8	**Disabled**, Enabled	Enable Connector Event for device subscription.

USB SW Device Mode Port #9	**Disabled**, Enabled	Enable Connector Event for device subscription.

9.4.2.4. PCHI-I/O Configuration > Security Configuration

Feature	Options	Description
BIOS Lock	**Disabled**, Enabled	Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.

9.4.2.5. PCHI-I/O Configuration > HD Audio Configuration

Feature	Options	Description
HD Audio	Disabled, **Enabled**	Control Detection of the HD-Audio device.Disabled = HDA will be unconditionally disabledEnabled = HDA will be unconditionally enabled.

9.5. Security

Feature	Options	Description
Administrator Password	Enter password	Set Administrator Password
User Password	Enter password	Set User Password
HDD Security Configuration	Info only	
Secure Boot	submenu	

9.5.1 Secure Boot Menu

Feature	Options	Description
Secure Mode	Info only	
Secure Boot	**Disabled** Enabled	Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode, The mode change requires platform reset
Secure Boot Mode	**Standard** Custom	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full
Restore Factory Keys	Info only	Force System to User Mode. Install factory default Secure Boot key databases
Reset To Setup Mode	Info only	
Expert Key Management		Enables expert users to modify Secure Boot Policy variables without full authentication

9.6. Boot

9.6.1 Boot Configuration

Feature	Options	Description
Boot Configuration	Info only	
Setup Prompt Timeout	**1**	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	**On** Off	Select the keyboard NumLock state
Quiet Boot	Disabled **Enabled**	Enables or disables Quiet Boot option
Fast Boot	Disabled **Enabled**	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
SATA Support	**Last Boot SATA Devices Only** All Sata Devices	If Last Boot SATA Devices Only, Only last boot SATA device will be available in Post. If All Sata Devices, all SATA devices will be available in OS and Post.
NVME Support	Disabled **Enabled**	If Disabled, NVMe device will be skipped.
VGA Support	Auto **EFI Driver**	If Auto, only install Legacy OpRom with Legacy OS and logo would NOT be shown during post. Efi driver will still be installed with EFI OS.
USB Support	Disabled **Full Initial** Partial Initial	If Disabled, all USB devices will NOT be available until after OS boot. If Partial Initial, USB Mass Storage and specific USB port/device will NOT be available before OS boot. If Enabled, all USB devices will be available in OS and Post.
PS2 Devices Support	Disabled	If Disabled, PS2 devices will be skipped.

Feature	Options	Description
	Enabled	
NetWork Stack Driver Support	**Disabled** Enabled	If Disabled, NetWork Stack Driver will be skipped.
Redirection Support	Disabled **Enabled**	If disable, Redirection function will be disabled.

9.7. Save & Exit

9.7.1 Save Options

Feature	Options	Description
Save Changes and Exit		Exit system setup after saving the changes.
Discard Changes and Exit		Exit system setup without saving any changes.
Save Changes and Reset		Reset the system after saving the changes.
Discard Changes and Reset		Reset system setup without saving any changes.
Save Options	Info only	
Save Changes		Save changes done so far to any of the setup options.
Discard Changes		Discard Changes done so far to any of the setup options.
Restore Defaults		Restore/Load Default values for all the setup options.
Save as User Defaults		Save the changes done so far as User Defaults.
Restore User Defaults		Restore the User Defaults to all the setup options.